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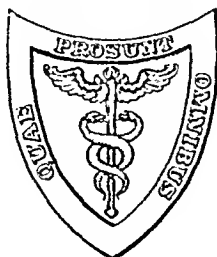
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SURGICAL APPLICATION OF THE RÖNTGEN RAYS.¹

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DURING the period of development of any new process of exploration or method of treatment it is useful from time to time to sum up the results accomplished and to compare the views of various workers in the same field. It has seemed to me that a paper on the Röntgen rays, to be of interest or value to this Association, should not be an attempt at an exhaustive review of all the clinical work that has been done by this method, but should rather present for discussion a series of conclusions based upon such work or of questions suggested by it. I have therefore not attempted to prepare a formal paper, but for the sake of bringing the subject up for consideration have tried to formulate tentatively and as concisely as possible the present state of our knowledge as to the surgical applications of skiagraphy, with the hope that my conclusions may be corrected or supplemented by the experience of other members.

The subdivisions of the subject are naturally partly clinical and partly anatomical. I shall take them up *seriatim*, following in a general way the chronological order of their development, and beginning with

FOREIGN BODIES.—(a) It is now possible to say dogmatically that substances more opaque to the rays than the tissues by which they are surrounded, and situated in the limbs, the walls of the chest, abdomen, or pelvis, in the neck, the scalp, or the bones of the cranium, can be discovered and located with entire accuracy by skiagraphs taken from two or more directions.

A single picture, while conclusively demonstrating the presence of the intruder in a given locality, may readily be very misleading as to its exact relation to important structures. If any considerable period

¹ Read before the American Surgical Association, May, 1897.

has elapsed between the taking of the skiagraph and operation, the frequency of movement of foreign bodies in the tissues should not be lost sight of. In one case of my own a needle was shown a quarter of an inch beneath the skin over the upper end of the tibia in a young child. A week intervened. At the operation a distinct induration was felt at this point. On cutting down upon it no needle was to be found there. It was discovered after a careful dissection lying beneath the periosteum at the side of the tibial tubercle. Examples of this well-known mobility of foreign bodies might easily be multiplied. Mr. Turner, of King's College Hospital, has recorded a case (*The Lancet*, June 20, 1896) in which, after six skiagraphs and three operations, a needle in the sole of the foot still eluded the operator. In such instances the possibility of the foreign body having gained access to a tendon sheath should be remembered, as, if it is very small and fine, it might easily be there and escape recognition by touch while search for it was conducted throughout the whole neighboring region.

Dr. Walsh has found (*British Medical Journal*, March 27, 1897) that in those parts of the body where surface-markings exist these markings could be reproduced in a skiagraph by rubbing a little powdered oxide of bismuth into the creases of the skin. He has suggested that in this way a complete surface-map with numerous lines of latitude and longitude could be made available as a guide to the knife of the operator who is searching for a very fine and easily overlooked foreign body.

(b) *In the cavities of the body* foreign bodies can be located by a system of triangulation by means of successive skiagraphs having known relations to one another and to a fixed point on the surface of the body next the plate. Exner (*Wien. klin. Woch.*, January 7, 1897) has described a process by means of which he has been able to locate bodies on the fluorescent screen. He places the lamp on one of two graduated arms at right angles to each other, one being perpendicular to and the other parallel with the screen. Measurements are made by pieces of lead sliding upon the perpendicular arm of the stand. Their projection upon the screen determines both the size and the location of the foreign body. The method seems reasonable if views from different directions are taken, but it is open to the objection that in planning an important operation the surgeon must either depend entirely upon the testimony of some one else or take the large amount of time required not only to make such examinations, but also to acquire technical familiarity with the apparatus. If a series of skiagraphs is made they can be studied at leisure, and a permanent record can be kept.

In the *cranial cavity* bullets have been located and removed. The recognition of the bullet seems likely to be easy in the majority of cases. In one of my patients a bullet under the scalp was skiagraphed from the opposite side of the head, the rays thus passing through the two

thicknesses of cranium as well as through the scalp and the brain tissue. The localization is far more difficult. The system of triangulation will probably apply here, but of course clinical symptoms and other methods of exploration, as the telephonic probe, which was used in a case of Fowler's (*Brooklyn Medical Journal*, 1896, p. 755), will always be valuable aids, and at present are almost indispensable.

The fluoroscope has in some instances been more valuable than the skiagraph, bullets being easily seen which could not be made to appear on a negative even after an exposure of an hour, as in a case of Bruce's (*Medical Record*, April 17, 1897). I have found it useful to indicate on the scalp by means of lead wire or lead paint the important localizing lines, as those of the fissure of Rolando, the fissure of Sylvius, Reid's base line, etc., so that the relation of the foreign body to these lines can be at least approximately estimated.

Scheier (*Deutsche med. Wochen.*, October 1, 1896) reports a case in which a bullet was located in the neighborhood of the right Gasserian ganglion five years after it had entered the cranial cavity through a wound just above the outer end of the superciliary ridge. A skiagraph at the time of the accident would have prevented an unnecessary exploration of the orbit which was made at that time.

Eulenberg (*Ibid.*, August 17, 1896) reports two cases, in each of which a bullet in the middle fossa was shown by skiagraphy.

Brissaud and Bonde (*Semaine Méd.*, June 24, 1896) located a bullet in the second temporal convolution. Other cases have been recorded.

In the thoracic cavity bullets can be located with reasonable accuracy in the trachea, bronchi, lungs, or pleura. In the case of a boy who swallowed a tack, Poch (*Wien. klin. Woch.*, November 12, 1896) first found the body with the fluoroscope; a skiagraph then showed it to be in the left lung on the level of the sixth intercostal space; two positions of the tube demonstrated that it was near the posterior wall of the thorax, as the shadows cast were not very far apart, and did not fall upon the vertebræ even when the tube was carried well to the left. I quote the case, as it gives in brief an idea of a rapid method of approximate localization.

It is worth mentioning that rubber drainage-tubes in the pleural cavity cannot invariably be detected by the Röntgen method, but seem to be more or less translucent to the rays. In a case of my own a very large-sized tube, which had disappeared and was thought to have been thrown out in the dressings, cast absolutely no shadow on the skiagraph plate, but was easily found and removed by forceps.

There can be little doubt that the difficult decision between operative interference and expectancy in penetrating gunshot wounds of the thorax without wound of exit will be greatly facilitated in the future by the accurate localization of the bullet.

I have now under treatment a young lad who accidentally shot himself with a 22-calibre parlor rifle. The ball entered the wall of the right chest on the mid-axillary line in the sixth interspace. The muzzle of the rifle was pointing upward. The patient complained bitterly of pain under the upper border of the right scapula. The history of the case and all the clinical phenomena would have led to exploration in that region, but the skiagraph shows the bullet in the lower lobe of the lung on a level with the tenth rib and near the middle line of the body. The picture also shows in a convincing manner a pulmonary area (corresponding to the lower lobe) of increased opacity and evidently the seat of blood effusion and inflammation. The patient has all the clinical symptoms of a traumatic pneumonia.

It is obvious that in the *œsophagus* the cases of detection and removal of foreign bodies will be, as they have been, very numerous and very satisfactory. The accuracy with which not only the presence of the intruder but its exact situation can be determined has gone far to resolve the doubts as to the choice of operation which used sometimes to be very grave ones. As the shape and size of the body can also be determined, the surgeon has all the facts which enable him to decide whether to make the attempt at removal by forceps or coin-catcher, to do an *œsophagotomy*, or to remove the body through the stomach. All of these methods have been successfully employed, and cases have been reported by Péan (*Bull. de l'Acad. de Méd.*, December 9, 1896); Bowlby and Marsh (*Lancet*, January 30, 1897); Raw (*British Medical Journal*, 1896, vol. ii. p. 1678; *Ibid.*, 1896, vol. ii. p. 1677); Bull (*Medical Record*, 1897); A. C. Wood (*University Medical Magazine*, October, 1896), and myself (*Ibid.*, June, 1896).

In the *abdominal cavity* the conditions are about the same as in the thorax. If the foreign body is within the intestinal tract, it is obviously difficult to determine the exact portion thereof which it occupies. A series of skiagraphs might, however, show such progressive motion as to make it evident that the body would be ejected spontaneously, and might thus demonstrate the propriety of expectant treatment. They would also go far to relieve the anxiety of the patient or the family, which is often extreme in these cases. It does not seem unlikely that in appropriate instances the presence of a foreign body in the stomach could be demonstrated by moderately distending that organ with a harmless opaque fluid, like lime-water, and observing whether or not the body disappeared from view. Neither is it impossible that if the shape and size permitted (as a Murphy button, for example) the body might, with the help of the fluoroscope, be seized by appropriately shaped forceps and withdrawn through the *œsophagus*.

Linderman (*Deut. med. Woch.*, April 22, 1897) demonstrates the outline of a dilated stomach by passing through the *œsophagus* a soft stomach-

tube armed with a metal mandrin; this follows the greater curvature of the stomach approximately, and by marking the umbilicus with a coin the outline of the viscus can be relatively demonstrated.

Kronberg (*Wien. med. Woch.*, May 23, 1896), arguing from the comparative innocuousness of metallic mercury when introduced into the alimentary canal, and its high atomic weight and associated opacity to x-rays, suggests its use in the diagnosis of affections of the internal viscera, especially intestinal obstruction. The method recommended is to administer a certain quantity of the metal, and to observe its position in the organs by means of skiagraphy. Kronberg has been able to fill practically the whole intestine of small animals with mercury; in larger ones and in the human cadaver he can follow the course of the metal through the gut. In actual practice he considers that one to two hundred grains of mercury should be given in cases of intestinal obstruction from volvulus, intussusception, fecal masses, paralysis, etc. Bettelheim has shown that this alone is in many cases sufficient to effect a cure, and it is claimed that with the aid of Röntgen's method the seat of the obstruction can be diagnosed. Kronberg further points out that the use of mercury in this way may be very valuable in the diagnosis and localization of fistulous tracks and their ramifications in inaccessible parts of the body. In cases in which the use of mercury might be dangerous, he suggests the substitution of the rare metal, gallium, which melts at 30° C., and has only half the atomic weight (and therefore opacity) of quicksilver.

In the *pelvic cavity*, as the ilium, like all other bones, is penetrable by the rays, foreign bodies, if sufficiently opaque, can be found with certainty by taking skiagraphs with the patient in various positions.

In dismissing the subject of foreign bodies, I must allude to the great satisfaction the Röntgen method has given in dealing with the not uncommon class of patients who have imaginary foreign bodies and equally imaginary symptoms. Such persons, who formerly wandered from surgeon to surgeon until they found one willing to undertake an operation, and who then blamed him for not producing the supposititious cause of their troubles, can now be convinced and usually cured by a few minutes' exposure to the x-rays.

FRACTURES AND LUXATIONS.—*Fractures of the skull* are so often difficult of recognition without operation that any addition to our diagnostic resources in this direction is greatly to be desired. Especially is it to be hoped that we may be able by the skiagraph to recognize (a) fracture of the inner table, (b) linear fracture, (c) fracture of the base.

The first two should be possible, though I can find no record of the work being done clinically. It has been done for me experimentally with entire success.

The skiagraphing of fracture of the base bristles with technical diffi-

eultics, but they do not seem to me to be insuperable. Many skiagraphs of normal skulls in living persons must first be made and studied, so that normal lines and shadows may be easily recognized.

Afterward the line of a fracture might, perhaps, be differentiated. Depressed fracture of the vault ought to be demonstrable in the majority of cases.

Fractures and dislocations of the spine.—Here, also, the obscurity of many cases will almost certainly in the future be resolved by skiagraphy with resulting benefit to both prognosis and treatment. If fractures without displacement could be recognized and distinguished from those more common ones in which dislocation has also occurred and persists, and if in the latter the exact degree of luxation could be seen and, therefore, the probable extent of the cord lesion estimated, we would have for the first time a satisfactory basis for deciding upon the method of treatment to be adopted in those distressing cases.

This work has been begun for me on the cadaver with moderate success, but the normal spine has been so often skiagraphed, both antero-posteriorly and laterally, that there seems to be no reason why we should not soon apply the method to patients who have sustained spinal injuries.

In fracture of the *sternum*, the *scapula*, the *clavicle*, and the *pelvic bones*, while I believe that no work of special importance has been reported, it is evident that the Röntgen method is competent to give us great help in obscure cases. In these instances, as in all cases where the shadow of one bone is necessarily superimposed upon that of another, the technical difficulties to be overcome in demonstrating abnormality are much increased. This remark also applies to all cases, either of fracture or dislocation, where it is impossible to get an entirely satisfactory view from both antero-posterior and lateral stand-points, as in lesions about the shoulder-joint or the hip-joint. In such regions, for example, absence of the head of the bone from its normal position can be demonstrated easily, but it is more difficult to show the exact position occupied by the displaced bone.

The *ribs* present special difficulties on account of the movements of respiration, but the latter in doubtful cases can be much restricted by a fixed dressing not opaque to the rays, like sodium silicate, and a skiagraph should then show the fracture, if there be one.

Fracture and luxation of *the bones of the extremities* (with the above-mentioned exceptions) can readily be demonstrated. In ordinary cases, skiagraphy does not seem essential to the management of these fractures, but there are very many cases in which it assumes great practical importance. As examples I may mention: (a) Fractures attended with so much swelling of surrounding tissues that satisfactory palpation of the fragments is impossible. In such cases, although the setting of the fracture may really have been entirely accurate, the uncertainty often

leads to another examination at an early date, and thus to unnecessary disturbance of the parts at a time when absolute quiet is important; or, to take the reverse of the picture, the professional attendant may have remained in ignorance of a faulty position of the fragments, which could be recognized only after the subsidence of swelling and too late for rectification, and which would result in permanent deformity or disability.

(b) Fractures about joints. The escape or the involvement of the joint in these cases is often a matter of doubt. The opinion arrived at influences both prognosis and treatment. Sometimes, especially in the smaller bones, as the phalanges, the decision as to the presence or absence of a fracture in the immediate neighborhood of a joint is exceedingly difficult to arrive at by ordinary methods, crepitus often being absent, and preternatural mobility being readily confused with the joint motion.

(c) In epiphyseal separations, where also crepitus is often absent and the proximity to the joint confusing, the deformity is slight and the patient frequently so young that no information can be obtained as to the occurrence of traumatism or as to subjective symptoms.

(d) A few special fractures, chief among which is fracture of the femoral neck. If the presence or absence of this fracture in the many doubtful cases could be conclusively shown, and, still better, if it could be demonstrated in a given case whether or not the fracture was exclusively intra-capsular, most valuable information obviously affecting both prognosis and treatment would be acquired.

Mr. Rowland (*British Medical Journal*, December 5, 1896) has recorded a case in which he diagnosticated a fracture of the neck of the femur in an adult of muscular build, who was six feet in height. The negative would not admit of printing, but it was sufficiently distinct to furnish a tracing, which was of great use in directing the treatment. Wullstein (*Berliner klin. Woch.*, April 19, 1897) reports a similar case, and another in which the differential diagnosis between fracture of the neck of the femur and luxation was made by a skiagraph. This fracture has been produced in the cadaver and an excellent skiagraph of it made for me.

Fractures of the os calcis and of the astragalus, both occasionally somewhat difficult of detection, have been shown clearly. I have had cases of each.

In certain special fractures the Röntgen method has been applied with very satisfactory results. The exact nature of the injury has been shown in a number of cases of fracture of the lower end of the radius by Conant (*Boston Medical and Surgical Journal*, April 15, 1897).

Ununited fracture, even in the presence of close fibrous union, can be demonstrated with great accuracy, and if several views are taken the rays can usually be made to show the exact line and extent of the fracture. I have found this in several cases a great convenience as enabling me definitely to plan the operation in advance, and to decide upon the

particular method to be employed for the purpose of fixation—silver wire, steel pins, or a plate and screws. Work has already been begun in the study of the repair of fractures, and it is now possible to determine the presence or absence of the lime salts in the bond of union between the fragments. This, we may venture to hope, will in some cases prove of valuable assistance in determining the time of removal of the original dressing or the original splints, and, when necessary, the prolongation of the period of treatment in cases with a tendency to delayed union or to non-union, as shown by continued translucency of the callus.

If the fixed dressing is made of one of the silicates the further progress of the case may even be watched through it, and the need for more active measures, such as friction of the fragments on each other, may be thus determined.

If the ambulatory treatment of fractures of the lower extremity gains in favor, the ability to note the presence or absence of deformity, if some material not, like plaster, opaque to the rays can be used, will remove one of the greatest practical objections to the method.

I do not mean to assert that all this is possible at the present time, but I believe it will be a development of the near future.

In the disability following old fractures near joints and complicated luxations I have found skiagraphs of the region to be of the greatest help in determining the mechanical cause of the limitation of motion, and in deciding whether excision of the joint involved or some less radical procedure should be adopted.

Before leaving the subject of fractures, it may be well to present for discussion a few questions having a medico-legal bearing, even although it may not be possible at present to answer them finally.

We may begin by asking whether skiagraphy has as yet given us a better understanding of fractures in general, or has been the means of suggesting more efficient treatment.

It is difficult in reply to point to any one definite addition to our knowledge of these injuries, and so far as I know no material modification of the general rules governing the treatment either of fractures generally or of any specific fracture has as yet resulted; but in individual cases, such as have been described above, it has certainly been of great utility, and is likely to become more valuable as technique improves and experience increases.

The question whether or not the patient has the right to demand, as ordinary care, that the medical attendant should have a skiagraph of the fracture taken, I would at this time unhesitatingly answer in the negative. Until a much larger number of cases have been observed and the pictures and the clinical results have been compared, the routine use of skiagraphy might be more harmful than useful.

Mr. Gerard Smith has called attention (*British Medical Journal*,

November 14, 1896) to the necessity for eliminating the errors due to distortion of the image, owing to the want of parallelism of the objects, the rays, and the plate, or screen, respectively. As he says, the most extraordinary apparent deformities of the bones, in the shape of bendings, enlargements, and even of partial dislocation, can be produced both on the screen and the plate, by varying the angles and position the rays make with the limbs and the receiving surface. Mr. Cottam (*Ibid.*, February 6th) carefully examined skiagraphs published in the *British Medical Journal*, purporting to show fractures of the styloid process of each ulna in a case of double Colles fracture. He states that on comparing them with his own skiagraphs of the normal wrist and with those of an old-standing Colles fracture, he found that in the *British Medical Journal* pictures the styloid process of the ulna was in its normal position on each side and was unbroken.

Whether he or the previous reporter was correct is immaterial. The incident well illustrates the point I desire to make in reference to the undesirability, at least at present, of favoring the routine use of skiagraphy as an essential in the diagnosis and treatment of all fractures.

There can be no doubt, however, that skiagraphs will figure largely in suits for damages after accidents and in cases of alleged malpractice. They have already been admitted as evidence in such cases, and it is probable that juries will, with increasing frequency, have to decide whether to place greater weight on deformity as shown by skiagraphs, or on expert evidence as to the absence of genuine disability. It seems obvious that each case must be studied by itself; but that it would be injudicious, if not altogether unwarranted, for us to assume at present that clinical experience and the judgment based upon it should be subordinated to the pictorial testimony of the skiagraph.

It is not, however, too soon to advise that in all obscure, complicated, and unusually difficult cases the help afforded by the Röntgen rays shall be secured by the surgeon, even if it is done chiefly with a view to his own protection.

As time goes on it is probable that we shall be better able to estimate accurately the precise clinical value of minor deformities. In the mean time, it seems to me, we should be careful to avoid the setting up of an impossible ideal as a standard in fracture cases.

DISEASES OF BONES AND JOINTS.—It now appears to be beyond reasonable doubt that in the future we shall be able to make a definite diagnosis and to decide upon the form of treatment earlier than heretofore, in a large variety of cases involving the bones and the articulations. Rowland (*British Medical Journal*, October 3, 1896) has been able with facility to recognize caries of the cervical spine. Macintyre (*Ibid.*) has made excellent pictures of early tubercular disease of the hip in children. The former (*Ibid.*) has also shown the lesions of rheu-

matoid arthritis in the shoulder. Osteoma is, of course, easy of recognition. Intracranial exostosis and the ravages of osseous gummata in the same region should be demonstrable.

Göbel (*Deut. med. Woch.*, April 22, 1897) observed, in a case of osteomalacia that had had multiple fractures of different bones, that there were no shadows thrown by the bones, although they were perfectly distinct in other normal cases with the same tube. A comparison of the various bones of this patient with those of healthy individuals showed that they were much more translucent, the marrow cavity being transparent, while the wall of the bone was only visible at the margins of the bone-shadows. This was accounted for by the decreased amount of bone-salts. The study of rhachitis should give valuable and probably analogous results.

I have been able in the long bones to locate the site of the disease in cases of central abscess, caseous degeneration, and osteosarcoma. The pictures, with or without the aid of clinical symptoms, would in several such cases have been conclusive as to the exact position of the lesion. But the accurate differentiation of these diseases by the skiagraph has not yet been possible in my experience. In each case there is an absorption or diminution of lime-salts, producing a similar decrease of opacity over the affected area, whether the bone is the seat of a neoplasm, is the subject of cheesy or fatty metamorphosis, or is occupied by a collection of pus. It is probable that we shall learn later to distinguish between these conditions. At any rate, with but slight additions to the knowledge we now have, we shall be in a position to recommend operation earlier and to plan it more accurately than was formerly the case. In tubercular disease of joints, for example, we may be able to determine and to remove the original focus of disease before the articulation becomes seriously affected; we may obtain much help in making the choice between erosion and excision; we may determine in advance of operation in children whether or not the neighboring epiphyses are involved, and so decide between excision and amputation. Wullstein (*loc. cit.*) has demonstrated the different stages of coxitis in children.

In congenital luxations of the hip the condition of the acetabulum and of the femur have been shown and studied. In all varieties of talipes the precise relation of the bones to each other, the amount necessary to remove, if osteotomy is necessary, and the probable efficiency of orthopedic apparatus can be worked out almost as if the dissected specimen were available. (Barwell, *Lancet*, vol. ii., 1896, January 30, 1897.)

In Pott's disease not only can the carious vertebra be shown, but by aspiration of the resultant abscess and injection with iodoform emulsion the cavity and ramifications of the abscess up to its vertebral origin can be clearly demonstrated. This has been done for me with entire success. The changes produced by rheumatoid arthritis can be clearly seen, as I

have already said, and it seems to me that it would be interesting to study by skiagraphy the condition of such joints while undergoing the latest and in some respects the most promising method of treatment—that by superheated dry air. I have arranged to have this observation made.

In a case of arthritis deformans affecting the cervical spine the pathological changes were shown for me in detail: the tendons of the spinal muscles involved were the subject of calcification.

Periarthritis ought in doubtful cases to be more clearly distinguishable from true joint-disease. The mechanism of metatarsalgia has been shown and its diagnosis greatly facilitated by skiagraphy. (Morton, *International Medical Magazine*, 1896, p. 329.) Floating bodies in the knee-joint have been seen, as in a case reported by Weir (*Medical Record*, April 3, 1897), and bodies connected with bursæ, as in the same case.

On the whole, it is evident that skiagraphy has added, and is likely to continue to add, to the definiteness and precision of our management of many forms of disease of bones and joints.

Returning to the cavities of the body (which I have only considered in relation to intruders from without), it would appear that in a number of conditions in which surgeons and physicians are almost equally interested, the x-rays are likely to be of great service. I have already mentioned a case of gunshot wound followed by traumatic pneumonia and now under observation. If in that instance the pneumonia proves to be septic and suppuration ensues, as shown by the clinical symptoms (or possibly by the skiagraph itself), I shall be in a position to open and drain the lung abscess far sooner and more efficiently than if I were compelled to base my action solely on physical diagnosis. As Bouehard has been able clearly to recognize pleural effusions, patches of consolidation in the lungs, and pulmonary cavities (*Semaine Méd.*, December 9 and 23, 1896), it is conceivable that we may with advantage extend the field of operation in at least the latter class of cases. Grummaeh (*Berlin klin. Woch.*, June, 1896) has made a similar series of observations, as has Williams, of Boston (*Boston Med. and Surg. Journ.*, Oct. 1, 1896).

The fluoroscope seems likely in these cases, as in various forms of cardiac disease, to be more useful than the skiagraph, as the latter in the case of organs in motion can only give the net result during the period of exposure. With fluoroscopic help, for example, we may be able in suspected pericardial effusions to employ paracentesis more frequently and more successfully. Mediastinal disease of various sorts should also be more easily discoverable in the early stages. Leonard has shown (*University Medical Magazine*, 1896, p. 237) the possibility of recognizing and outlining intrathoracic aneurism.

The diagnosis between supra- and infra-diaphragmatic abscess, often extremely difficult, may be aided by a comparison of the density of shadow in the affected region with the normal standard. This is yet to be established, and only by many observations and records.

In all this work, in fact, it must be understood that we are as yet merely on the threshold. I am talking of what seems to me to be possibilities, with the desire either of having their impracticability shown, if it exists, or, on the other hand, of aiding in the development of the method along these lines. It should be remembered, however, in estimating the future of skiagraphy, that by variations in the time of exposure, the length of focus, etc., it is possible to photograph certain portions of the trunk and omit others—to take the spine, for example, and omit the heart and sternum, or *vice versa*. The heart in action, the diaphragm in motion, the limits of the pleural cavities having all been seen, the extension of the method in the directions indicated seems, on the whole, likely soon to occur. (Macintyre, *Lancet*, August 15 and 22, 1896.)

Below the diaphragm the most interesting unsettled points relate to the value of the Röntgen rays in determining with certainty the presence or absence of various forms of calculi. As to gall-stones, it has long been known that outside of the body they cast a distinct shadow which Mr. Morris (*Lancet*, November 14, 1896) estimates at half the density of the shadow of the uric-acid calculus. Gall-stones have also been shown clearly when placed in the gall-bladder of a cadaver. In actual practice, however, in cases associated with jaundice, with excess of bile in the gall-bladder, or with chronic inflammation and thickening of the surrounding tissues, they have not yet been well demonstrated.

The opacity of the tissues around them, especially when impregnated with bile-salts, is so similar to that of the calculi themselves, that the latter do not show in the fully developed negative. In three cases in my practice they have been seen during the process of development of the plate, and were subsequently found and removed by operation, but no print showing their shadows was obtainable.

Experiment is constantly going on now to determine the amount of exposure necessary in different cases for the rays to penetrate the ordinary tissues without also penetrating the calculi. It will be seen that in gall-bladder cases this will vary with the thickness of the abdominal walls, the presence or absence of jaundice or its degrees, the depth of the calculi from the surface, etc., and that much experience will be required before the diagnosis can be made with certainty. At present it is safe to say that while in some cases the shadow cast by gall-stones warrants a positive assertion of their presence, the absence of such shadow does not demonstrate their absence.

The above remarks apply without modification to *enteroliths*.

Renal calculi have been found in various cases, and successful operations have been based on the skiagraphic evidence (Macintyre, *British Medical Journal*, July 25, 1896). Swain has had a similar case. He has shown (*Bristol Medico-Chirurgical Journal*, March, 1897), as have others, that oxalic calculi are almost impermeable to the rays, the shadow being correspondingly dense; phosphatic calculi come next,

casting a fairly deep shadow, and then, though much fainter, some uric-acid calculi, not very far removed in impenetrability from bile-stones. As uric acid is so frequently the predominating constituent of renal calculi, it is evident that the remarks as to time of exposure, the variation with the individual, etc., made in reference to the search for gall-stones or for intestinal calculi, are applicable also to these cases. There can be little doubt, however, that we shall soon be able to diagnose renal calculi of every variety with almost unvarying accuracy.

Vesical calculi are more difficult, on account of the superposition of the bones of the pelvis. The cases in which the skiagraph would be of most value are those of pouched bladder or partially encysted calculus associated with enlarged prostate. Of course, if the enlargement prevents the introduction of a metal instrument into the bladder, the advantage of a skiagraph would be exceptionally great. Unfortunately, the conditions which indicate the need for such a picture are also unfavorable to its production.

Experiment shows that stones can be clearly seen in an ordinary adult bladder. In a boy of eight the stone has been shown *in situ* (Lawrie, *Lancet*, January 16, 1897).

Foreign bodies, such as hair-pins, have been seen and removed (Leifert, *Centralblatt für Gynäkologie*, No. 1, 1897). If, as seems probable, we can apply the method to the above-mentioned class of cases and to the exploration of the bladder after litholapaxy, we shall owe to it another marked addition to our surgical resources.

Ureteral stone has not yet been seen clinically, but seems likely to be easy of recognition.

I am having made at present a series of observations on the opacity of various materials used in surgery as antiseptics and for dressings or in the form of lotions or local applications. It seems desirable that we should know what materials should be selected in cases in which it is possible that skiagraphy may be required without disturbance of dressings. The results, with which I need not now detain you, will be incorporated with this paper when it is published.

The apparent toxic effect of the rays upon the skin of operators and subjects, producing dermatitis, alopecia, loss of the nails, and even, according to Gilechrist (*Johns Hopkins Hospital Bulletin*, March, 1897), an osteoplastic periostitis and osteitis (as shown by the skiagraph and by the clinical symptoms), has been widely discussed of late. Several dozen cases have been reported. It seems probable at this time that it is not merely an effect of close contact with the electric current employed, and is not due to any of the chemicals used, but is a specific effect of the rays themselves, some persons being more susceptible than others. Dr. Thorne has asserted that in two instances, after a prolonged examination of the heart, that organ has demonstrably diminished in

size, in one case by as much as two inches. The observation remains unconfirmed, and is contradicted by Dr. Thomson (*British Medical Journal*, October 24 and November 7, 1896).

The possible therapeutic properties of the rays have from the first engaged the attention of some members of our profession. They were thought to be germicidal, and a positive announcement to this effect was made, but was soon with equal positiveness denied. Quite recently (*Semaine Méd.*, January 20, 1897) Rendu has revived the matter by reporting the case of a man, aged twenty years, who had an illness, beginning with characteristic typhoid symptoms and followed by typical infective pneumonia. Pure cultures of staphylococcus were found in the sputum. After an incomplete defervescence the fever returned, and all the signs of suppuration of the pleura or lung developed. Examination of the sputum, which could only be obtained twice, showed a few tubercle bacilli, but the respective parts played by the staphylococcus and the bacillus could not be determined. Whatever the exact nature of the disease, the patient, at the end of six weeks' illness, with hectic temperature, appeared to be dying. He was then exposed to the Röntgen rays for fifty-five minutes every day. After the fourth exposure the temperature fell by crisis, and never rose again. This was accompanied by diuresis and diaphoresis, and the patient was soon quite well. This may have been a coincidence, but no other change in the treatment or conditions was made. After ten applications erythema and ulceration of the skin appeared, and it is possible that equally marked trophic changes took place in the deeper tissues also. In the discussion which followed the paper, Du Castel thought the success of the treatment pointed to the staphylococcus being the cause of the illness, since all the attempts to prevent the development of tuberculosis by the same means had hitherto failed.

I must confess that, as with every new discovery, my thoughts turn to its possible application to a subject which has an invincible attraction for me—the cure of cancer. I was led in a purely speculative and empirical manner to direct the use of the x-rays in a number of inoperable cases of cancer in various regions. My small hopes of success were bolstered up somewhat by reflections upon the hypothetical bacterial cause of cancer, upon the wonderful effect of sunlight on the tubercle bacillus, upon the remembrance that the most powerful germicidal effects of the sun are caused by the rays near the violet end of the spectrum and having the most chemical activity, and that Röntgen rays are ultra-violet and possess chemical activity (Lyon, *British Medical Journal*, February 1, 1896, and Bowles, *Ibid.*, March 1, 1896), and finally upon early vague reports of trophic changes produced by the x-rays.

I have no results to report. Indeed, as yet, I have no results at all, but I was surprised to find that what last fall seemed to me an entirely original thought had occurred to V. Despeignes, who in July and

August, 1896, had reported in the *Lyon Médical* a case of gastric carcinoma which had appeared to be greatly benefited by the transmission of the rays through the seat of disease. More recently the same gentleman states (*Lyon Médical*, December 28, 1896; *British Medical Journal*, February 20, 1897) that after the report of his case appeared he received a communication from L. Voight, Director of the Vaccine Institute of Hamburg, giving an account of the following case: The patient was a man aged eighty-three years, who had complained for nine months of difficulty in swallowing and of pain in the left ear and in the occipital and cervical distributions of the left facial nerve. There was a small epithelial chancreoid ulcer in the mouth, starting from the lingual fold, with an enlarged gland in the submaxillary region. Salivation was continual and pain so severe as to require regular administration of morphine. On August 28th the application of Röntgen rays was begun with an apparatus yielding sparks of 10 em., used in two daily sittings of one-half and sometimes one-quarter of an hour; the pain almost immediately diminished so much that the morphine was discontinued, except an occasional dose at night to induce sleep. The patient was beginning to hope for a cure, but the disease invaded the left part of the tongue; salivation did not cease, and the difficulty in swallowing increased. The patient became emaciated, and died on October 22d of pneumonia, after one hundred applications of the rays, which gave him considerable relief. The good effect of the rays was not attributed to suggestion, because it lasted eight weeks, nor to destruction of sensory nerves, since, as a matter of fact, these were not destroyed. The growth did not, as in Despeignes' case, diminish in volume. Voight thinks that it may, however, be taken as proved that, if the rays have little or no action on the evolution of the disease, their anæsthetic effect is very marked. It may be added that after the eightieth sitting the skin of the left cervical region became almost as black as that of a negro; a similar pigmentation took place on the right side when the rays were directed upon that side.

I intend to continue my own experiments until I am convinced that they are useless.

In the mean time the increasing evidence as to the trophic changes apparently produced by the rays have led me to resolve in addition to extend their attempted therapeutic use to those cases of extensive capillary nævus which sometimes make such hideous deformities, to similar cases of hairy moles, to inoperable cases of keloid and hypertrophied cicatrix, and to analogous cases not adapted to removal by the knife or amenable to other well-established surgical procedures.

I feel reasonably sure, as in the cancer cases, of doing my patients no harm, even if the experiment is an entire failure.¹

¹ The skiagraphs which illustrate this paper were made by Dr. C. L. Leonard at the Hospital of the University of Pennsylvania.

FIG. 1.



Penny in esophagus of child.

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FIG. 2.



A. Bullet in astragalus.

FIG. 3.



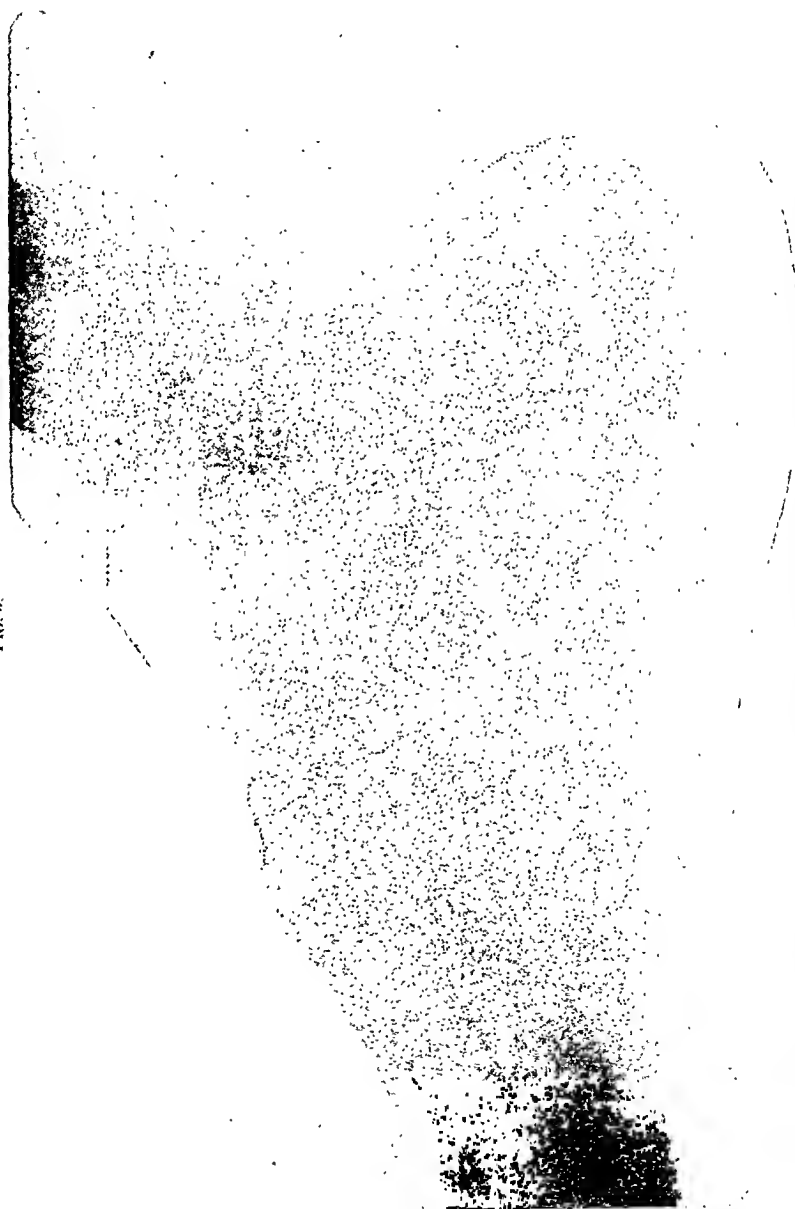
Fracture of the styloid process of the ulna.

FIG. 4.



Dislocation at metatarsophalangeal articulation of great toe.

FIG. 5.



Fracture of os calcis; a comparison with the normal shows a marked change in the relative positions of the bones, especially the astragalus and os calcis.

FIG. 6.



Normal foot of fracture of os calcis.

FIG. 7.



Excision of the knee. Result as shown through a plaster-of-Paris dressing. The mottled appearance is due to the varying thickness of the plaster.

FIG. 8.



Epiphysitis of proximal epiphysis of humerus.

FIG. 9.



Normal of epiphysitis case.

FIG. 10.



Tubercular osteomyelitis of tibia. Compare with normal. (Right.)

FIG. 11.



Normal of osteomyelitis case. (Left.)

ON CHRONIC SYMMETRICAL ENLARGEMENT OF THE
SALIVARY AND LACHRYMAL GLANDS.

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IN the second edition of my *Text-book of Medicine*, issued in 1895, under the heading of "Chronic Parotitis" I mention the case of a young girl, aged thirteen years, then under my care, "who has had for nearly a year enlargement of all the salivary glands, the lachrymal glands, the buccal mucous glands, and the spleen." The case interested me a great deal, and I searched in the literature at my disposal without finding any condition exactly like it. I had overlooked the fact that Mikuliez,¹ in 1892, had described the condition as a characterized form of chronic disease previously unrecognized. His patient, a man, aged forty-seven years, for seven months had symmetrical enlargement of the lachrymal glands, and subsequently of all the salivary glands.

Quite recently Kümmel² has met with a series of cases, and has collected one or two which had been previously described in the literature. His first case, a man, aged thirty-three years, had swelling of the salivary and both lachrymal glands in association with chronic hypertrophic rhinitis and asthma. He was cured by arsenic. The second case was a man, aged twenty-five years, who had had for two years slight swelling of all the salivary and lachrymal glands. The third case was a man, aged twenty-eight years, who had enlargement of all the salivary glands, particularly of the right parotid. The buccal and lachrymal glands were not enlarged. The fourth case, a woman, aged twenty-seven years, had swelling of both parotids and submaxillaries of two years' duration. The lachrymal glands were not involved. She had also a dry mouth. Both of these cases followed influenza. The fifth case, a man, aged forty-seven years, had swelling of both parotids only, of some years' duration. The sixth case was a woman, aged twenty-three years, in whom the submaxillary glands were swollen for six months. The other cases in the literature were the one of Mikuliez, already spoken of; one of Tietze, a male, aged thirty-six years, who for ten years had swelling of the parotid glands, and for four years swelling of the lachrymal glands. The ninth case was reported by Hallenhoff: a girl, aged twelve years, had for four months enlargement of the lachrymal, parotid, and submaxillary glands. Very full abstracts of these cases are given in Kümmel's paper.

¹ Bruns' Beiträge (Billroth's Festschrift, 1892).² Mittheilungen aus dem Grenzgebiete der Medicin und Chirurgie, Bd. ii., 1897.

The history of the case which has been under my observation is as follows:

For more than a year enlargement of the lachrymal, salivary, and buccal mucous glands; enlargement of the spleen; syphilitic rhinitis; tuberculosis of the pleura and lungs; death. Hannah W., aged eleven years, colored, was admitted March 30, 1894, complaining of swollen glands in the neck.

Family History.—Father living, but delicate; mother died of typhoid fever. One sister has had convulsions. She has two brothers and several sisters, all of whom are healthy.

Personal History.—It is difficult to get any satisfactory account from her or her relatives. She says she has always been very well. Two years ago she had chills and fever for a month.



Present Illness.—Six weeks ago she began to feel dull and heavy, and the woman with whom she lived noticed that her face and neck were a little swollen. She did not complain of any pain. At the same time she had slight sores in the mouth and a discharge from the nose.

I saw her on March 31st, and dictated the following note: The child is well nourished, and has a good color; the tongue is clean. The eyes

are a little prominent. A remarkable feature is the symmetrical enlargement of both parotid glands, which stand out very prominently and tilt up the lobes of the ears. To the touch they are painless, and have a firm, board-like hardness. The outlines and lobulations of the glands can be felt with the greatest distinctness. The orifices of the ducts are a little swollen and firm, and a little mucus can be pressed out. Both submaxillary glands are enlarged and firm and hard. The sublingual glands can also be seen as a prominent nodular mass beneath the skin. The child's eyes are naturally prominent, but what adds strikingly to this feature is an enlargement of the lachrymal glands, causing marked bulging just above the outer canthus of each eye. They can be readily felt, and the lobulations are quite distinct. Just within the lower lip there is a small group of enlarged mucous glands. Just beyond the angle of the mouth on either side there are groups of the buccal glands, ten or twelve in number, greatly enlarged, the size of small peas. No other of the buccal glands are enlarged. The tonsils are moderately swollen. The accompanying figure, from a photograph, shows well the enlargement of the salivary glands, but not that of the lachrymal.

At the time of her admission there was no discharge from the nose. There were no signs of interstitial keratitis, and the upper central incisor teeth were well formed. There was slight general enlargement of the lymphatic glands over the body, particularly of those in the posterior cervical triangles. The spleen was enlarged; the edge could be easily felt beneath the costal border, and on deep inspiration the notch could be felt. The liver was not enlarged. The urine was of a natural yellow color, acid reaction, specific gravity 1025, and contained no albumin. The child remained under observation for more than a year. Cultures made from the mucus squeezed from the parotid ducts were negative.

Throughout the summer of 1894 the condition of the glands remained about the same. In June, before I went for my vacation, I noted that "the glands are still large and hard, without any special change." The spleen was perhaps a little smaller.

On October 1st I made the following note: "The right parotid gland is now smaller than the left. The right submaxillary and right sublingual glands are somewhat larger than they were in June. The lymph glands in the posterior cervical triangle have increased in size. The lachrymal glands have become somewhat smaller. The spleen is still to be felt nearly two fingers' breadth below the costal margin. The enlargement of the buccal glands persists." Several careful examinations of the blood were made throughout the spring and summer. The highest count of leucocytes was 10,300 per c.c. There was never any anemia; the red blood-corpuscles were usually above normal.

In October and November she had a good deal of swelling of the nose, with elevation of the bridge, and Dr. Warfield reported that there was a good deal of thickening of the cartilaginous septum.

Throughout January and February there was distinct ulceration, which Dr. Warfield regarded as syphilitic, and she was ordered the iodide of potassium and mercurial inunctions.

In March, 1895, the right lachrymal gland became very much reduced in size, and was hardly perceptible. The left remained as large as previously. On March 27th she had a slight aphthous sore-throat, which was followed by an increase in the enlargement of the salivary glands, particularly of the right parotid and its extension on the cheek.

On April 6, 1895, she began to be feverish, and had pain in the right side of the chest, due to an attack of acute pleurisy with effusion. She had irregular fever through April and May. She gradually improved, and it was noticed throughout May and June that the swelling of the salivary and lachrymal glands had gradually reduced, and on July 19th it was noted that the parotid glands were no longer enlarged. The swelling of the submaxillary and sublingual glands had also disappeared, and the buccal glands were no longer to be seen.

On my return in September, 1895, I noted that there was a complete disappearance of the enlarged glands, and the spleen could only just be felt on the deepest inspiration.

The subsequent history of this case may be briefly referred to. She was readmitted to the hospital April 18, 1897, with signs of chronic pulmonary tuberculosis, with cavities at the right base. She died in July, 1897.

Dr. Livingood, who performed the autopsy, tells me that the lachrymal glands were represented by fibrous structure, and there was at the time of the autopsy no trace of any enlargement of the salivary glands.

When this case first came under observation I thought that possibly it was associated with an inherited syphilis, and this seemed to be borne out by the subsequent development of a rhinitis, regarded by Dr. Warfield as syphilitic. This opinion appeared to be borne out by the gradual disappearance of the swellings, slowly, it is true, under the use of mercury and the iodide of potassium. It is interesting to note that swelling of one or both parotids may occur in secondary syphilis, an instance of which was at that time under observation in a student. Enlargement of the spleen, as in the case here reported, is not mentioned in any of the other cases. Subsequently the question arose as to the possibility of a tuberculous affection of the glands, an idea not confirmed by the subsequent history.

Both Mikulicz and Kümmel regard the disease as a chronic infection of as yet unknown origin. The enlargement of the glands may persist for months or years; causes no general disturbance; is painless. The condition occurs, as a rule, in persons at the middle period of life. Kümmel has made a careful histological study of the enlarged glands, and finds a complete substitution of the normal tissue by leucocytes. He suggests the name *achroöcytosis*, indicating a replacement by colorless corpuscles of the glandular elements.

The condition, though not serious, is unsightly, and on this account troublesome. Arsenic seems to have been very beneficial in several cases, and should it fail, iodide of potassium should be used.

THE CLINICAL ASPECTS OF THE "INTERNAL SECRETIONS."
(NATURE OF THE THYROIDAL CACHEXIAS, INFANTILISM, ACROMEGALY,
GRAVES'S DISEASE).

BY JAMES J. PUTNAM, M.D.,
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THE clinical observations which have been made during the past few years with regard to the cachexias following thyroidal disease have not greatly changed our views of the fundamental problems of thyroidal pathology, and, interesting as they are in detail,² there are not many of them which have seemed to me appropriate for a brief and general discussion such as this, more especially since they have received such thorough treatment, within the past year, in the monographs of Ewald,³ Buschan,⁴ and Pel,⁵ and at the hands of the readers who have preceded me this afternoon in presenting the pathological, physiological, and therapeutical aspects of the subject of the "internal secretions." I shall, therefore, so far as the time at my disposal allows, consider some of the analogies and contrasts between the effects of disease or removal of the thyroid, the generative organs, and the pituitary body, in the hope of gaining in this way wider conceptions of the nature of the influences at work in one or another special case. For it is obvious that wider conceptions are not only of theoretic interest in this connection, but that without them we shall never penetrate the shroud of mystery which envelops the functions and diseases of these organs.

The researches which have been made hitherto into the pathology and clinical history of the diseases of thyroidal origin—whether those of thyroidal deficiency, such as myxœdema, or those assumed to be due to excess or alteration of the thyroidal secretions, of which Graves's disease is the prominent representative—have been conducted, very properly, with the object of defining such types of disease as were well marked and of determinable etiology, and separating them from the more or less miscellaneous affections with which they might be confounded.

But, important as this analytic method has been and will continue to be, it cannot be regarded as likely to give us all the information that we need. We are rather in the habit of assuming that the removal of large portions of the thyroid does no harm, provided it does not cause

¹ Read at the Congress of Physicians and Surgeons in Washington, May, 1897.

² Among the most important are the investigations into the metabolism of the thyroidal diseases, but they are not suited for brief analysis.

³ Die Erkrankungen des Schilddrüse, Myxœdem u. Cretinismus. Nothnagel's Spec. Path. u. Therapie. Band lxxxviii.

⁴ Urb. Myxœdem, und Verwandte Zustände, 1896.

⁵ Volkmann's Samml. klin. Vorträge, 1895, No. 123.

myxœdema. But the probability is that we shall learn to recognize affections which lie between myxœdema and health, as well as peculiarities of development and disorders of nutrition for which the thyroid is more or less responsible; but the attempt to do this meets at once with the difficulty that in these cases a new equilibrium seems to have been established so that the effects of the thyroid disease are no longer obvious, sometimes, perhaps, no longer felt.

The recent experiments of 'Halsted' have shown that bitches whose thyroids had been partially removed may remain, under ordinary circumstances, in apparently good health, and yet give birth to young that are incapable of sustaining life and have thyroids hypertrophied to ten or twenty times the normal size; and Kocher believes that goitre and cretinism are often inherited, in infected districts, from parents who have no obvious disease of the thyroid, but whose thyroïdal functions have suffered some kind of impairment.

The very fact that large portions of the thyroid can be removed without exciting myxœdema inclines one to believe that morbid results occur which we do not yet know how to recognize, for otherwise we should have to assume that its previous bulk was unnecessary, and this in face of the observation (Halsted) that even when the tip of the gland is experimentally injured the whole organ undergoes changes of "hypertrophic" character, leading apparently to an increase of its secreting structure.

It is still a question whether the concurrence of thyroid disease with various dystrophies not characterized by the typical symptoms of cachexia thyreopriva, as in the interesting cases of subcutaneous fat, hypertrophy, etc., reported by Dercum and Henry,² or with the obesity of hogs (Lenz, *Deutsche med. Woch.*, 1895, p. 597), or in cases of infantilism, indicates a relationship which is in some degree causal.

Again, it has been suggested by Horsley¹ and by Gley and Ballet, that we may sometimes find symptoms due to excess or alteration of the thyroid secretion side by side with symptoms of deficiency.

In this way, Horsley thinks, we may best account for the occurrence of dyspnœa (which is so often seen in the case of animals whose thyroids have been removed) in conjunction with the symptoms of Graves's disease.

But if it is entirely conceivable that disorders of nutrition of one or another sort, besides myxœdema, are sometimes due to deficiency of thyroïdal secretion, or irritative nervous symptoms hitherto unexplained, to its excess or alteration, it is obvious that we have as yet no suffi-

¹ An Experimental Study of the Thyroids of Dogs, etc. Johns Hopkins Hospital Reports, i.

² AMERICAN JOURNAL OF THE MEDICAL SCIENCES, November, 1892. Ewald, in his monograph (loc. cit.) says that he has seen a similar case.

³ British Medical Journal, 1896.

⁴ Semaine Méd., 1895, p. 330.

ciently good touchstone to enable us to determine the question in a given case. All that we can do is to define so far as possible the directions in which research may safely tend.

Can we use the success or failure of treatment by thyroid preparations as an indication that a given disease is or is not of thyroid origin?

The usual assumption seems to be that the success of such treatment, as occasionally in skin diseases, is not a reason for referring the symptoms to this cause. This is probably correct, but we have not an equal right to deny the thyroid origin, or partial origin, of all affections which are not favorably influenced by treatment of this sort. This argument of failure to respond to treatment has been used as against the view that endemic cretinism is a thyroid affection, and yet there are few persons who now deny that tabes is in some sense due to syphilis merely because it is not curable by mercury. Each case must be decided on its merits, after taking all the circumstances into consideration, and the arguments from the effects of treatment are not conclusive in either sense. A good deal of doubt is felt by some competent authorities as to whether endemic cretinism should be classed as a thyroid disease, and I wish to consider some of the arguments on either side of the question, even though it is impossible to reach a definite conclusion, because they open up some new points of view which are important in this connection.

The question has, moreover, a special interest for us, since our countryman, Munson, has shown that goitre, with which in Europe cretinism is closely associated, is endemic among the Indians of the West, especially those living in Montana and Wyoming, on the western slopes of the Rocky Mountains. The writer, an army surgeon stationed at Fort Assinaboine, Montana, has collected reports from among the government physicians at the Indian agencies, covering an Indian population of 147,873 persons. The proportion of goitrous persons reached in some tribes 4.2 per cent. The same mystery shrouds the origin of the disease here as in the mountainous areas of middle Europe. It is obvious that locality is the important factor, but, as Munson shows, the whites in the same locality and drinking the same water are not affected in the same way. They are also less degraded and intermarry less often.

The mineral composition of the drinking-water is given in the paper, but the geological data have not yet been worked out enough to justify a comparison with the conditions existing in Europe.

Cretinism seems to occur but rarely among the Indians; in fact, only one case has been reported.¹ Closer investigations may show this opinion to be erroneous, or may explain the cause of the difference between the conditions existing here and those in Switzerland.

The writer concludes that the factor of main importance is that of

¹ New York Medical Journal, 1895, li. p. 513.

race; but, in view of what the European observations have taught, it seems more likely that this is rather one of the predisposing influences which so strangely complicate the attempt to discover the real cause at work.

A similar predisposition exists in heredity. Munson states that the goitrous Indian children are generally born of goitrous parents; but the tendency must have had a beginning independent of direct inheritance, and so we are forced back to a condition of affairs of which the simplest analogue is perhaps afforded by the experiments of Halsted which have just been referred to.

The topographic localization of endemic goitre was carefully traced by Bireher¹ in 1883, and his results seem to incriminate the drinking-water coming from certain geological formations, not, however, as deriving any particular chemical constituent from those formations themselves, but as probably taking up some organic substance, the nature of which is wholly unknown. Kocher's observations² do not wholly bear out Bireher's view that the strata from which the dangerous waters come are so limited in kind, and the matter is still *sub judice*.

The consensus of opinion among the best trained observers is, thus, that endemic goitre is caused by an organic poison, but it is still entirely uncertain whether this acts primarily upon the parenchyma of the thyroid or primarily upon the tissues of other organs. In the latter case, and sometimes even in the former, the disease of the thyroid may be conceived of as resulting from an ineffective effort at neutralization of a tissue poison, or some analogous form of action which, for lack of a more definite term, we express in that way.

The opinion of Kocher, formed after many years of observation,³ that endemic cretinism is of thyroidal origin, and is due to an hereditary influence, even though the parents were free from obvious goitre, is in harmony with this view.

The principal current beliefs as to the nature of endemic cretinism are three. The first assumes that it is essentially identical with infantile myxœdema, and due, like that, to disease of the thyroid—though only partial disease, since complete removal of the (goitrous) thyroid from a cretin brings on myxœdema.⁴ This view is held by able observers, including Kocher. The second assumes that cretinism is inde-

¹ Der endemische Kropf, u. seine Beziehungen zur Tannstümmlichkeit und zum Cretinismus. Basel, 1883. (See the careful summary given by Ewald, loc. cit.)

² Vorkommen u. Verhretung des Kropfes in der Canton Bern, 1889. (See also a letter in the Boston Medical and Surgical Journal, June 24, 1897.

³ Loc. cit.

⁴ An important study of the thyroid (and hypophysis) of cretins, by De Coulon (Virch. Arch., Bd. 147, S. 53) has come to my notice since this paper was first prepared. He found evidences of thyroid degeneration, primary or secondary, in all of his cases, including one of special interest, where the bodily signs of cretinism had been present without the usual mental deficiency.

pendent of thyroidal disease, but is due to the same unknown cause with that which induces endemic goitre. This was the opinion of Virchow, though advanced at a time when the nature of the thyroid functions was unknown, but it has been strongly maintained of late by Bireher on the basis of his great experience. The third view is that of Busehan,¹ who considers that endemic cretinism represents a mixture of myxœdematous cachexia with "degeneracy," due to in-breeding and debased conditions of life.

In the same sense, Bourneville has pointed out that various forms of idiocy may be united with the thyroid cachexia without being in any way related to it.

The arguments bearing on the first two of these views are fairly presented by Ewald, in his monograph.² He does not commit himself positively to either of them, but believes that true cretinism is probably dependent in part upon thyroid disease, while admitting that the shape and mode of ossification of the cranium, the peculiarities of growth of the skeleton, the character of the mental deficiency, the frequent association with deaf-mutism, the relatively slight capacity for improvement under thyroid treatment, and other indications, not to speak of the (usual) presence of goitre, militate for the conclusion that this affection deserves to be classified by itself.

The "degeneracy" view of Busehan is reasonable, except that it does not say much that is definite. "Degeneracy" is a broad and vague term. What is it and how shall it be classified biologically? and under what other circumstances of in-breeding do we meet this particular form of it? Such are the questions which press for an answer.

If a comparison be drawn between the effects of removal of the thyroid and those of removal of the generative apparatus, it will appear at first sight that in the former case we have to do with a deep-seated disorder of general nutrition, in the latter, with a specific change in the tendencies of growth. But on a closer view it is, I think, apparent that the differences in either sense are only of degrees, not of kind. There are "positive" characters in cretinism and myxœdema which one is liable to lose sight of if he looks at these affections simply as examples of degradation or poisoning, and, conversely, the changes induced by castration, and still more the conditions which arise in connection with defects in the tendencies of development of which the generative function is the centre, bear, in some respects, the aspect of disease.

When any organ of the body is removed two forces are set at work. One of these is the toxic action of various substances, probably not one, but many, while the other is the influence attending the effort of the organism to establish a satisfactory readjustment on a new basis. The

¹ Loc. cit.

² Loc. cit.

former of these forces is, in name at least, familiar; it is the latter force that demands closer attention than it has generally received. In the case of pronounced myxœdema the progressive impairment of vitality due to the cachexia overshadows the other tendencies at work, but we shall be more ready to admit that such tendencies may be present after glancing at the kindred results which follow the loss of the generative organs, for these organs represent functions which are likewise of fundamental importance for general nutrition.

In the complex series of changes following castration, such as lead to the formation of the eunuch or the ox,¹ we see these efforts at readjustment culminating in the production, not of a poisoned and stunted individual of the original sort, but of a new individual of a different sort, though not always free from disease. If an analogous process takes place in foetal life or at impregnation, such that a blow is struck at the developmental tendency of which the sexual function is the centre, we see a still more elaborate set of changes induced, and these may lead to "infantilism," which may, again, be looked on as a successful result up to a certain point, though it is a condition which is liable to become associated with degenerative dystrophies of various kinds.

It is conceivable that the secondary changes due to eunuchism might be cured by following the line of treatment so useful for myxœdema, and giving testicular preparations; and I am surprised that this has never, either in therapeutics or experimentally, been attempted. It would, however, be hard to believe that the same treatment would work satisfactorily in infantilism.

The remarkable series of changes which occur when the thyroid gland atrophies or is removed bear so obviously the stamp of disease that the observer slips only too easily into the habit of designating them as "cachectic" and seeking to refer them to the influence of some special poison.

Perhaps no better single name than cachectic could be found, and, indeed, its use seems abundantly justified by the fact that as a rule these changes lead fatally to a progressive degradation of the vital processes. But this degradation is neither so rapidly fatal nor so inevitably progressive as that, for example, which follows removal of the suprarenal capsules or the pancreas, and for certain groups of cases the progression of the cachexia is so slow that we have practically to deal with a stable organism. Such cases are the milder types of myxœdema, especially myxœdema of infantile origin, endemic cretinism, and such dystrophies as may be referred in part to thyroid disease.

The effects of castration and the altered tendencies of growth implied

¹ Especially interesting as a case of general hypertrophy of the skeleton.

by the term "infantilism"¹ are not called "cachectic," but they are certainly due in part to changes in the composition of the blood, and, as in the case of the athyroidal diseases, it is doubtful if any single term could fully indicate their nature. Darwin and Milne-Edwards refer the results of castration to the action of "compensation," the nutritive material set free by the removal of one organ going to increase the available supply of material for other organs. It is probable, however, that the views of these investigators would have been stated differently if they had been familiar with the pathological data now at our command.

The ox, the eapon, the eunuch seem, indeed, to have gained in one way as much as they have lost in another—though this could not be positively asserted without studies into their metabolism, made with special reference to the toxicity of the blood and urine, and especially in the early stages of the metamorphosis—but the obesity which so often follows oöphorectomy is perhaps a sign of disease, and the same may be said of the many nervous and mental symptoms which attend castration both in the male and the female.

I have no wish to attempt any new theory to account for the vast series of changes in the "secondary sexual attributes," through which, after castration, the male is modified in the direction of the female, and the female² in the direction of the male (or both in the direction of the neuter); but it may be admissible to point out that the influence at work must be in great part humoral in character, and that the chemical character of the secretions must be subject to constant change as the process goes on.

Illustrations of the truth of the former statement are given in the fact that the neutral worker-bee can be made by change of food to develop into the queen—though, according to Milne-Edwards, with diminution of intelligence—and that Hunter found the transplanted spur of the cock-chicken to grow but very slowly on the leg of the hen, while the spur of the hen-chicken transplanted to the cock grew as rapidly as the normal cock's spur.

The warrant for the statement that one could hardly expect to find a constant chemical condition of the blood and other fluids, be they toxic or not, would seem to be given in the fact that the gross structure is progressively changing in so many respects, and parts are being gained or lost which must have definite functions relatively to the rest of the body as organs of excretion or modification of the blood.

¹ This term was, according to Meigs, first introduced by Brouardel. It indicates a condition, slight degrees of which are familiar to everyone, which represents a relative arrest of development at the moment of adolescence or younger. The arrest affects primarily the genital sphere, but involves the "secondary sexual qualities" of both mind and body, and leads to peculiarities of the feminine type.

² As in birds and other animals, after cessation of ovulation, or after disease of the ovaries, as well as after castration.

The series of changes which represent the primary result of castration must act in their turn as provocative causes of a second series of changes, and these will stand in only an indirect relation to the special chemical substances with which the blood became charged in consequence of the first generative disease or mutilation.

It may be assumed that when, through the administration of thyroid preparations, the process of disentanglement is initiated, as in the treatment of myxœdema, the "poison" which is neutralized is only that which stands at the end of a series and not one which stands behind each and every one of the morbid processes at stake, though how far this suggestion is of practical importance is uncertain.

Our knowledge of the group of affections not directly resulting from castration, but due to a blow struck, further back, at the developmental tendency of which the sexual function is the central point, has been widened within a few years by the observations of Brouardel, Brissaud,¹ and Meige.²

The conditions designated by these writers as infantilism and feminism, slight degrees of which are probably very common, are not only of interest in a general way for the discussion of the "internal secretions," as representing the modifications of the "secondary sexual characters" carried to a further point than after castration, but they are of peculiar interest as being conditions which are often associated with thyroid disease.

The removal or atrophy of the thyroid in infancy absolutely checks the development of the genital organs and function, but it also checks and modifies development in so many other respects that the distinctively sexual results are overshadowed.

In the "infantile," however, the effects of thyroidal disease, though they must often be present in greater or less degree,³ are overshadowed by tendencies of growth of a specialized morphological character.

Infantilism is apt to be associated with other dystrophies and abnormalities, such as dwarfism, gigautism, feminism, muscular dystrophies, and impairment of the special senses.

The subject will be made clearer by a brief account of an interesting case which I have recently had an opportunity to examine through the courtesy of Dr. F. C. Shattuck.

The case is that of a young man, recently a patient under Dr. Shattuck's care in the Massachusetts General Hospital. (See Fig. 1.) He has been blind from birth (with optic nerve atrophy and disseminated choroiditis), and, although seventeen years old, is a dwarf in size, stand-

¹ *Leçons de la Salpêtrière.*

² *L'Anthropologie*, 1895, p. 257.

³ Post-mortem evidence on this point is not abundant, but Meige says that the thyroid is "generally small" in infantilism, and that Brissaud has found it rudimentary in one autopsy.

ing but four feet four and a half inches high, and is infantile in genital development.

The skin is rather dry and coarse, and there are pads of fat above the clavicles, and spots of vascular congestion on the cheeks, but the hands are not large and no myxoedematous swelling is evident. The abdomen is protuberant, and lordosis is present. He is knock-kneed. His muscles are not only weak—as they have been since birth—but are

FIG. 1.



FIG. 2.



distinctly dystrophic, and have grown steadily more feeble of late, so that he cannot get up from the floor without the aid of his arms, with which he either braces himself against his own thighs or catches hold of his chair. The calves are dense, but not large. The gait is slow and waddling. His intelligence is good for ordinary matters; but he is timid, emotional, and child-like in temperament.

This case is, however, of more interest than as an example of simple infantilism or infantilism complicated by developmental muscular dystrophy and disease of the eyes and by diminutive stature and marks of femininity. I, fortunately, had the opportunity to study the cases of the boy's mother and sister, and found in them additional signs of interest from the thyroidal standpoint, in that both of them had goitres of small size, while the sister, like the brother, was almost blind, and also had disseminated choroiditis; and, although an intelligent girl and suffi-

ciently well grown in height, and of considerable beauty of face, had reached almost fifteen years without ever having menstruated, and showed at least one other stigma of degeneration in that she had but two upper incisor teeth. She presented also some nervous symptoms, such as general excitability and a tendency to dizziness and faintness and frontal headaches, and had a somewhat rapid pulse (90 to 96) on the occasion of my two examinations, and a temperature of 99° F.

The mother of these children could give no history of earlier cases of either goitres or myxœdema, but the important fact was developed that the parents were cousins of the first degree.

The natural comment would be that these are examples of "degeneration" due to in-breeding; but does the much-abused term "degeneration" convey a satisfactory explanation? We know, through the researches of Meige and others, that in infantilism the thyroid as well as the sexual apparatus is usually small, and that infantilism is apt to associate itself with others of these strange disorders of growth—with cretinism and infantile myxœdema—affections due in large part to thyroid disease—and, as has been said, with various progressive degenerative atrophies of developmental character. This is, of course, degeneration, but it is degeneration of a specific sort, in the production of which changes in the internal secretions perhaps play a prominent part.

It is still a question how far in the direction of what is ordinarily called "health" we ought to extend our conception of the thyroïdal cachexia; whether, for example, it is probable that some of the changes ordinarily attributed to old age, and, on the other hand, the various slight defects in tendencies of growth in children, or of nutritive weaknesses in adults, such as those showing themselves on the parts of mothers in impaired reproductive powers, or failure to provide properly for the growth of the fœtus, are due to lack of thyroid secretion.

I have dwelt at this length on the subject of infantilism in order to emphasize the view that a close relationship may exist between altered conditions of metabolism due to a specific change in the composition of the blood, such as follows castration or thyroïdectomy performed after birth, and complex disorders of the developmental tendencies, in the midst of which the specific alteration of the blood appears only as one feature of the process. It is legitimate to look for corresponding analogies and relationships among the diseases centring around the thyroid, and perhaps we may find in this way an explanation of endemic cretinism.

Again, the tendency shown by infantilism to associate itself with degenerative disorders not obviously definable as diseases of secondary sexual attributes is possibly analogous to the tendency which unites certain dystrophies, like obesity, with affections of the thyroid.

As regards the failure of nutrition in old age, Ewald expresses the

opinion that it is due not to atrophy of the thyroid, but to impairment of the intestinal absorption; but we have no sufficient data for deciding as to the relationship of obesity, tetany, scleroderma, and rickets to thyroid atrophy, except the inadequate argument from the success or failure of treatment.

This subject of obesity in its relation to thyroid treatment was discussed at the Congress of German physicians at Wiesbaden last year, and Spitzer there pointed out that a sharp distinction should be made between the obesity due to food and mode of life and that due to lack of metabolic activity on the part of the tissues. Theoretically, it would only be in the latter form that thyroid preparations, which are a powerful stimulant to proteid metabolism, ought to be of special service. Ewald, however, in his recent monograph on the thyroid disease,¹ says that in practice he has not found this distinction tenable.

If this argument from the effects of treatment is not considered decisive as against the thyroïdal origin of a given disease, then the very interesting cases reported by Dercum and Henry ought to be recalled in this connection. Here a peculiar form of subcutaneous dystrophy with accumulation of fat was present, and in two instances the thyroid was demonstrated to be calcareous. Ewald reports that he has seen another case of similar sort to these. I would again suggest that the relationship of obesity, etc., to the thyroïdal cachexia may be similar to that of progressive muscular dystrophy to infantilism. In a similar sense the various forms of idiocy which, as Bourneville says, are conjoined with the thyroïdal cachexia without being of thyroïdal origin, may perhaps be in a sense related to it.

It is a noteworthy fact that the true cretin is not helped by treatment with thyroid preparations to anything like the extent that the so-called sporadic cretin or myxœdematous child is. This shows, either that the cause of his disease lies further back than the loss of his thyroid, both the goitre and the cretinism resulting perhaps from the same influence, or else that the condition is a complex one and only partly of thyroid origin; but it does not show that thyroid disease has or had nothing to do with his symptoms, any more than the failure of an attempt to cure tabes by mercury shows that that disease is not of syphilitic origin.

The only clinical data which have as yet thrown light upon the functions of the pituitary body are those which have been gathered in the study of acromegaly.

It is beyond a question, as a glance at the accompanying charts will show,² that a close connection exists between disease of the pituitary body and the symptoms of this affection, and a moderately close connec-

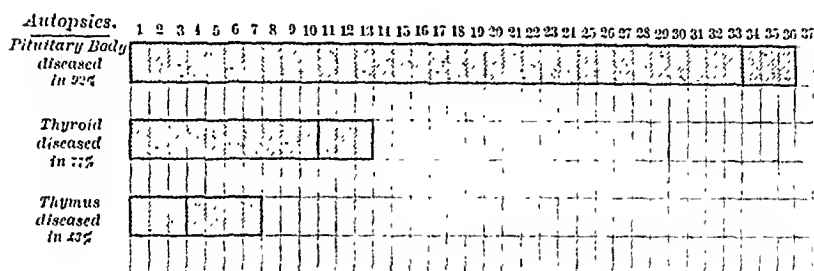
¹ Nothnagel's *Specielle Path. u. Therapie*. Loc. cit.

² Based on reports collected for me with great care by Dr. Franklin W. White.

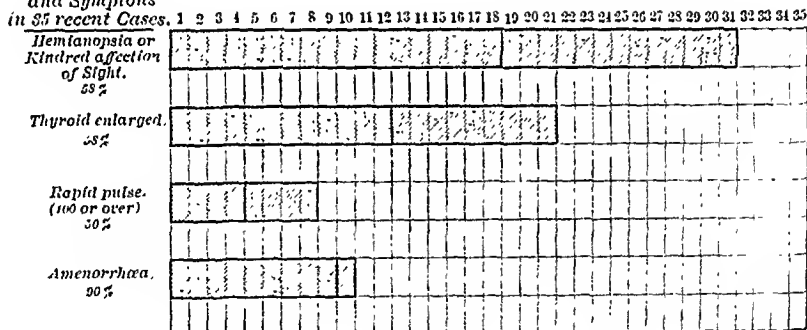
tion between acromegaly and thyroid disease; but as to the nature of these associations, neither physiological experiment nor pathological research has as yet enlightened us. The character of the pituitary disease varies greatly, but the fact that the organ is commonly enlarged is shown by the frequency with which hemianopia, presumably from compression of the optic nerves, is present during life. (Fig. 2.)

What is the relationship of acromegaly to gigantism? May that also be of similar character with that between eunuchism and infantilism?

FIG. 2



Significant Signs and Symptoms



The black portion represents the number of cases in which lesion was found; the lighter shaded portion represents the number of cases in which the organ is stated to have been normal. In the other cases no statement was made as to the organs. The line at the top gives the number of cases. The percentages are given in round numbers.

Marie,¹ the author of our first carefully drawn descriptions of these affections, thinks that there is nothing in common between them, and that the frequency with which the two conditions are associated is due solely to the fact that the acromegalic tendency occurs during the period of growth; it causes increase in height, suggesting gigantism; whereas, if it occurs in adult life, the hypertrophic tendency is expended on the extremities of the long bones. Sternberg² believes that gigantism,

¹ Soc. méd. des Hôpitaux de Paris, 1896, third series, xii. p. 443.

² Zeitschrift für klin. med., 1895, xxvii. p. 86.

although not a disease, is a condition which, like infantilism, readily associates itself with all sorts of dystrophies—a view identical with that expressed by Meige¹ with regard to infantilism—and that chief among these dystrophies is acromegaly, which is a disease.

It seems to me, however, that when it comes to drawing sharp distinctions between “disease” and “abnormality such as readily associates itself with disease,” the task is a hard one, and that the evidence brought forward by Dana,² Brissaud,³ Massalongo, Walker,⁴ Hutchinson,⁵ Schwoner,⁶ and by Sternberg himself, showing the frequency with which acromegaly and gigantism, or unusual development in point of size, are associated, and associated even (Schwoner) in a hereditary sense, is too impressive to be made light of. Sternberg says that of 130 cases of acromegaly, about 23 per cent. show giant growth; and that of thirty-four giants about 40 per cent. appear to have had acromegaly. The only case of acromegaly which I have seen affected a woman decidedly above the usual size.

I have not thought it necessary for the purpose of this discussion to enter at length on the question of the disease of the pituitary body, or the thyroid, in relation to acromegaly, and will say, in brief, that thirty-seven post-mortems have been reported in cases of acromegaly, and that with three exceptions disease of the pituitary body was present in all. In the large majority of cases where the thyroid has been mentioned it was found diseased (ten out of thirteen). The affection is at any rate due to a deep-seated disorder of nutrition in which these organs are immediately concerned.

If one casts a glance over this whole range of diseases that we have been hurriedly considering—eunuchism, infantilism, acromegaly, gigantism, cretinism, infantile and adult myxœdema—and considers what sorts of departures from normal states they represent, the suspicion becomes grounded that they can be brought into some sort of harmony with each other. These affections are all substantially toxic in origin and all in great part due to the loss or disease of an important organ—the testicle, the pituitary body,⁷ the thyroid and kindred glands—or else join hands with the loss of the special organ as being both expressions of a developmental defect lying further back.

But the point is that in either case the symptoms and anatomical

¹ For a careful examination of the recent literature of acromegaly I am indebted to Dr Franklin W. White.

² New York Journal of Nervous and Mental Diseases. 1893, xx.

³ Soc. Méd. des Hôp. de Paris, 1896, xli. p. 443.

⁴ Journal of the American Medical Association, 1897, xxviii.

⁵ Medical News, January 16, 1897.

⁶ Zeitschrift f. klin. Med., 1897, xxx. p. 202.

⁷ This statement must be modified as regards gigantism, since there is no evidence at present that this is associated with disease of the pituitary body.

changes are not to be looked upon as fortuitous combinations of morbid signs whose only bond is that they are all due equally to a common poison; nor is the term poison an adequate one to describe the agency that is at work.

What we see is—more or less vaguely, to be sure—that under the conditions stated a new “set,” as it were, is given to the developmental forces of the individual. The eunuch and the ox, the infantile or feminine man, the giant, the cretin, are not simply stunted and poisoned specimens of life; they represent attempts at reorganization on new lines. In myxœdema and kindred diseases this principle is less evidently at work, and the signs of the action of a poison seem more evident; but it may, nevertheless, be profitable to study them on these same lines.

The next subject for consideration is that of the etiology of Graves’s disease, which is associated with a thyroid affection of another sort.

What is the part played by the thyroid secretion in producing Graves’s disease? This is still a burning question among neurologists, and one of both theoretical and practical interest. It would be desirable to approach the solution by trying to answer the following questions:

1. How shall we define Graves’s disease, and is there but one affection that deserves this name, or are there various forms differing in symptomatology, etiology, and prognosis?

2. Is the Graves’s complex due purely and simply to thyroid poisoning, so that liability to the disease means only liability to disease of the thyroid, or is there a susceptibility due to peculiarity of the nervous system, and are there cases where this is the controlling factor? In other words, can Graves’s disease occur without a thyroid, and if not, can an analogous disorder exist on these terms, and what are its peculiarities?

3. Assuming that the thyroid secretion is the cause of the symptoms as we see them, can we, nevertheless, show that the thyroid disease is often secondary to events taking place in the nervous system?

4. Still assuming that the thyroid secretion excites nervous symptoms, does it do so in proportion to its amount, or is it possible, on the other hand, or even probable, that there is no direct proportion between the amount of excess of the secretion and the severity of the symptoms, so that a small gland is as likely to be associated with marked symptoms as a large gland?

5. To what extent is it possible to localize the lesions of the nervous system associated with Graves’s disease?

6. What is the value of the arguments as to the nature of the disease drawn from the effects of surgical or other therapeutical measures?

7. Is there any good reason to suppose that there is a special thyroid

poison which is necessary for the production of Graves's disease, and which does not exist in the normal gland?

I shall try to answer some of these questions, and shall offer, as in my opinion the most profitable point of view from which to study the subject, the suggestion that Graves's disease is the distorted representation of a physiological or quasi-physiological mechanism, and that just as emotional states and nervous states in general are intimately associated with more or less specific changes in general metabolism, so a similar association exists here, but that it has become dislocated and perverted in such a way that toxic symptoms result.

As regards the purely clinical evidence as to the nature of Graves's disease, every one must appreciate the force of the arguments which refer the symptoms to a poisoning with the thyroid secretions, and which make it appear that the thyroid disease is a primary lesion. This view is held by some of the best observers in every country, among whom is Horsley, whose name has been identified with the best work on the thyroid for so many years.

The general nature of these arguments is familiar to every one. The thyroid is almost always enlarged in Graves's disease, and where it has not been found enlarged during life, histological changes have been discovered post mortem.

These changes are almost always what is called hypertrophic—that is, they are such as to secure a larger secreting surface—and, although the secretion is usually deficient in colloid, it is nevertheless functionally efficient, as is shown by the fact that myxœdema does not occur, and that preparations made from the gland of a patient with Graves's disease had much the same effect as those made from normal sheep's gland (Hutcheon).¹

The symptoms of Graves's disease are almost certainly due, in part, to some poison, and experiments with thyroid preparations, both upon men and animals, indicate that the thyroid secretion is capable of producing analogous symptoms to those found in Graves's disease. It is also pointed out that the symptoms of Graves's disease are, in some respects, the converse of those seen in myxœdema; in other respects, similar to them.

On the other hand, it cannot be said that the thyroidal theory is in all respects satisfactory, and, hitherto, it has failed to command anything like a universal approbation.

The symptom-complex of Graves's disease is far richer and at the same time far more varied than that producible by thyroid preparations. The reasons for assuming an excess of secretion are by no means always sufficient, the more so that a partial atrophy of the gland, sufficient to excite myxœdematous symptoms, is no necessary bar to the per-

¹ Brit. Med. Journ., 1896.

sistence of some of the symptoms of the Graves's complex. To meet these difficulties it has been suggested that the thyroid secretion is not necessarily increased in quantity, but may be altered in character. This is possible, but of the fact of such alterations we have no knowledge, and the experiments of Hutchinson,¹ who made preparations from the excised thyroid from a Graves's disease patient, and studied their effects on both men and animals, indicated no difference between this secretion and that of an ordinary gland. Moreover, if we assume that the secretion has specific functions in Graves's disease, then we have no right to apply to it the arguments drawn from studies of the normal secretions. Various other criticisms of the thyroïdal theory, and also various other arguments in its favor, could be adduced, but I will refer only to that based upon the effects of surgical treatment by thyroidectomy and those based on the difference in apparent etiology and type between different groups of cases.

Can we infer from the fact that the patient improves more or less after the partial removal of a parenchymatous goitre in Graves's disease—perhaps only a long time after—that the goitre was itself the cause of the symptoms?

I believe that this method of reasoning is mistaken in theory and inconclusive in practice. The question is an interesting one, but I will dwell upon it no longer than to recall that most of us do not believe that because the removal of this or that peripheral irritation makes it easier for a patient to deal with some neurotic tendency, therefore the cause of the neuroses has been discovered. A failure to appreciate this has led to many an erroneous conclusion, as, for example, in regard to the relation between eye-strain and epilepsy or migraine.

If the argument from the success of thyroidectomy is held up as important, then the door is open to many new etiological theories based on similar ground.

For the vicious circle, of which the disease of the gland forms one link and the nervous erethism another, has been successfully broken into by many agencies—electricity, diet, intestinal antiseptics, thymus, and last, but not least, by treatments of the nature of hypnotic suggestion.

In talking of the etiology of Graves's disease, have we a right to assume that the cases to which that name is usually applied are always of one or the same sort?

From the clinical stand-point wide differences are to be seen in respect to etiology, mode of onset, symptomatology, and prognosis.

Who has not seen cases where a person, apparently healthy, has plunged almost at once, in consequence of some terrifying emotion, into a state closely resembling that of Graves's disease, and leading directly to that disease in its most pronounced form?

And, on the other hand, who has not seen similar symptoms, appearing little by little, in patients who had had indolent goitres without symptoms, perhaps for years, or both conditions coming on gradually in connection with chlorosis or in girls of feeble health?

It is the first class of cases that makes it seem almost imperative to regard Graves's disease as a fright-neurosis, while for the cases of the second class the nervous symptoms are often regarded as secondary (Busehan,¹ Marie,² and others), and it is pointed out that the eventual nervous symptoms in cases of this sort are rarely so severe or so numerous as in those of the former group.

It must not be forgotten, however, that intermediate cases exist between these two extremes, and that many cases are to be seen of either class which, when fully developed, are indistinguishable from those of the other.

An interesting example of the intermediate forms is afforded by the history of a family of a mother and nine children, from Aveyron, reported by Sottas.

The mother had a goitre associated with dyspnoea and palpitation; a daughter had a goitre without nervous symptoms; a second daughter had dyspnoea without goitre; a third daughter had a typical, serious Graves's disease induced by severe emotion, during which the heart action was powerfully affected; a fourth daughter had Graves's disease, but in a less pronounced form, and also of emotional origin. Four sons and one daughter remained free.

The acute cases are not always of emotional or nervous origin, as is shown by an interesting instance reported by Van Noorden in his recent monograph on chlorosis.³ In this case the typical Graves's complex sprang into existence, rose to a high point, and again disappeared in the course of a single week, while the patient, a chlorotic young woman, was under observation in the hospital. The thyroid swelled and again shrank, and finally disappeared as the symptoms advanced and receded. Yet no fright or other obvious nervous excitement could be discovered as having preceded this outbreak. It should be said that Van Noorden does not believe that chlorosis is the cause of Graves's disease or that the two affections are especially apt to be associated.

The cases arising under the influence of pregnancy and (perhaps) from intestinal poisons, and without apparent cause, are other sorts which do not fit exactly in either of the first-mentioned categories.

Considering these discrepancies, and remembering that a vastly greater number could be cited, it seems to me idle to expect that we can frame a really satisfactory and comprehensive theory of Graves's disease until

¹ Basedow'sche Krankheit Leipzig u. Wien., 1894, and elsewhere.

² See Rev. Neurologique, February 15, 1897.

³ Nothnagel's Specielle Path. und Therapie, Bd. viii.

we learn to penetrate far deeper than is now in our power into the mysteries which shroud the activity of the nervous system and its relationship to thyroid gland and to processes of general metabolism in health.

Every exclusive theory of the present moment is bound to be inadequate, but the consideration of each is likely to be profitable, if it secures us a clearer insight into the physiological and pathological principles that are involved.

One such principle is that the neuroses in general, among which Graves's disease is to a certain extent at least to be classed, owe their characteristics to the fact that they represent distorted and caricatured images of physiological arrangements, separated to a greater or less degree from their natural associations. The mechanism of which they are a caricature was designed to play a subordinate and co-ordinated part in furthering the ends of the economy as a whole, but as seen in disease it is segmented off and enters into independent activity and becomes enlarged and disfigured by forming new associations. By studying the peculiarities of such a neurosis we can often get a side light upon the normal conditions.

The symptoms of Graves's disease shade off, if one studies a large number of cases, into the phenomena of health.

The tremor, the rapid and excitable pulse, the flushed skin, the restlessness of mind, are seen almost habitually in many persons who are called simply nervous, and these symptoms and more, including the staring gaze, may come on suddenly, even in a presumably healthy person, under the influence of strong emotion, which may be called either a disease or a quasi-physiological state. In fact, the Graves's disease complex is but one of the wide range of results to which emotional disorders may lead, each of which must have its definite pathology. Anything which can be ascertained with regard to the physiological and chemical pathology of emotion is likely to throw light on the nature of Graves's disease, and *vice versa*. From this stand-point the toxic theory of Graves's disease becomes of special interest. If it is true, as Moebius—the able defender and essentially the author of the thyroïdal theory—suggests, that a sudden fright does not cause Graves's disease except where the thyroid was previously in an unstable condition, then it is equally likely that physical signs of fright, even in those cases where these signs subside more or less quickly, arise more easily when the blood contains certain constituents which render the nervous system more sensitive in this or that special way. Chemical theories of physiological processes seem less foreign to-day than they would have seemed a few years ago, and there is nothing especially unreasonable in the view that emotional states of more or less definite sort are foreshadowed in the metabolism of the individuals who are liable to them, just as habitual thoughts occur most readily the more readily they find the

appropriate expression awaiting them. If it is really the thyroid secretion (or some other product of disordered metabolism) that excites the symptoms of Graves's disease, then it may be that the presence of this secretion in the blood helps to insure the mobility of the nervous system in certain respects in health.

If the thyroid secretion has nothing to do, etiologically, with fright, then there is the more reason to think that the emotional form of Graves's disease is not of thyroid origin, and we may rest content with our old physiological theories as to the cause of the physiological element in fright.

I venture to suggest, at any rate, that if the thyroid secretion is the usual excitant of the Graves's complex it acts like a match applied to a combustible, by giving the final impulse necessary to the outbreak of the disease, rather than by exciting symptoms proportionate to its own amount. This seems to be borne out by the fact that the severity of the symptoms is by no means in the same ratio with the size of the gland, the most violent nervous symptoms sometimes being associated with a very small gland, which cannot even be felt, while the reverse is equally true. Again, the additional administration of thyroid preparations does not by any means necessarily increase the symptoms, as my own experience and that of others has abundantly shown. The degree and nature of the susceptibility seems to be the controlling factor.

If my view is correct, that, under the appropriate conditions as regards susceptibility, a small amount of the thyroid secretion may suffice to precipitate the disease, we can easily understand why this should occasionally happen when myxœdematous symptoms occur.

In the great majority of the reported cases of this sort the myxœdematous symptoms have supervened on those of Graves's disease, and it might be said that the latter had simply lasted over from acquired habit. But occasionally the sequence is reversed, and an interesting case of this sort has been communicated to me by Dr. Osler.

I will only repeat, in conclusion, that the importance of the analogy between Graves's disease and health is urged, not as an exclusive theory, but as one profitable mode of regarding the subject.

A CASE OF LEVANT FEVER.¹

BY A. ALEXANDER SMITH, M.D.,

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So far as I have been able to ascertain, this is the first case of Levant fever reported in this country.

Mrs. G., thirty-four years of age; married eleven years; came under my observation on January 13, 1897. She lived in the United States until the autumn of 1885, when she went to Syria.

Family History.—Father and mother are living and in good health. Brothers and sisters—five in all—in good health. No history of hereditary taint in either family of parents.

Previous History.—The patient always enjoyed good health, with the exception of whooping-cough and measles in childhood, until the autumn of 1888, when she was compelled to leave Aleppo, where she had been for six months, on account of recurring attacks of intermittent fever. These attacks began with slight chilliness, the fever following being continued and lasting three or four days. The attacks came regularly once in two weeks. The last attack occurred in July, 1889, while traveling on the Cilician plain from Tarsus to Aintab. It was the most severe of all. During none of these attacks was the blood examined. She had lived, before her marriage, in a malarious region in Southern Iowa, but had never had any malarial manifestations before.

In the autumn of 1889 she removed to Beirut, Syria, where she was apparently perfectly healthy until the autumn of 1895. In the summer of that year she visited America, and became much run down while staying with her parents in Southern Iowa. Upon returning to Beirut she had an unusually severe attack of typhoid fever, the fever lasting more than six weeks, and with hemorrhages from the intestine in the fourth and fifth weeks. After recovering from the typhoid fever she regained her usual flesh and strength very rapidly, and was apparently in her usual health until July 4th following. On that evening she sat out rather late at a garden party. That night she began to have fever. It was of a remittent type, and lasted four weeks. There was no diarrhoea, no hemorrhage from the nose or intestine, no eruption, no cough.

Quinine was given in twenty-grain doses in the morning, when the temperature was the lowest, the bowels having been previously cleared out, but with apparently no beneficial effect. At the end of four weeks the fever disappeared for three days, and then began again, but with greater severity, the morning temperature averaging 102.5° F., and the evening temperature 104° F. This second attack lasted also about four weeks. During the whole of the second attack she was kept on milk and Vichy. There was no delirium, no epistaxis, no eruption, and no enlargement of the spleen, and no diarrhoea. After this attack she remained free from fever about three weeks, and then went up to a village on the Anti-Lebanon range, about 6000 feet above sea-level. Here the fever again returned, early in October, 1896, and has been persistent up to the pres-

¹ Read before the Association of American Physicians, Washington, D. C., May 6, 1897.

ent time—January, 1897. In December the fever began to change its character (while on board a steamer leaving Beirut), and there was an intermission each day instead of a remission. She also began to have a slight chill each day (sometimes a severe one), and almost always about the same hour. While in Switzerland, in December, she was given large doses of quinine, as much as ninety grains a day, but without benefit. Twenty grains a day by subcutaneous injection failed to give more than temporary relief. The voyage across the Atlantic, early in January, 1897, gave much benefit, and she has continued to improve daily since her arrival in America. The attack of fever at the present time only lasts a few hours, beginning about 2 P.M. and passing off about 6 P.M.

Since coming to New York she has taken quinine on several occasions on going to bed, and with apparent good results. Her menstruation during all these attacks has been fairly regular. Since October she has had almost constantly severe night-sweats. These were most severe in Montreaux, Switzerland, in December, 1896. They were, at times, so severe that she was obliged to change her clothing as often as three times during the night. During all these attacks she had a fairly good appetite, and seemed to digest her food with but little distress. When put on a pure milk-diet, or milk and Viehy, her fever was not affected, and she lost flesh and strength more rapidly than when on a more liberal diet.

The foregoing history was furnished by the patient's husband, a physician. He has been practising in Beirut, Syria, several years, and states that his wife's case is similar to others he has seen, the disease being known there as "Levant fever."

When I first saw her a careful examination failed to reveal evidence of lesion of any kind anywhere in the body. The patient has been seen repeatedly since that time up to the latter part of April, and has on each occasion shown elevations of temperature at some time in the day, usually in the afternoon up to early evening. The daily variations have differed somewhat. At first they were about 2° , and in the month of February they continued about the same; but in March, for a period of six days, the diurnal variations were 3° . In April a careful record of the temperature was kept for ten days at a time, at two different periods, and the variations were sometimes as much as 4° F. When they were as great as this there would often be a subnormal temperature in the morning. Since the latter part of January she has been able to go about the city, and even make short trips out of town to visit friends. The improvement in her general condition has corresponded with the results of the examinations of the blood during this period, which have shown a continual improvement. The last examination of the blood was made on April 9th, and was as follows:

Red corpuscles	4,600,000 per c.mm.
White corpuscles	9,200 " "
Hæmoglobin	92 per cent.

Examination of the stained specimens showed the same parasite as herein described, but much less frequently. The red corpuscles were

otherwise normal. The leucocytes were apparently normal, and the various forms present in normal relative proportions.

The blood examinations were made by Dr. John S. Billings, Jr., who has had much experience in such work.

Report on the examination of the blood:

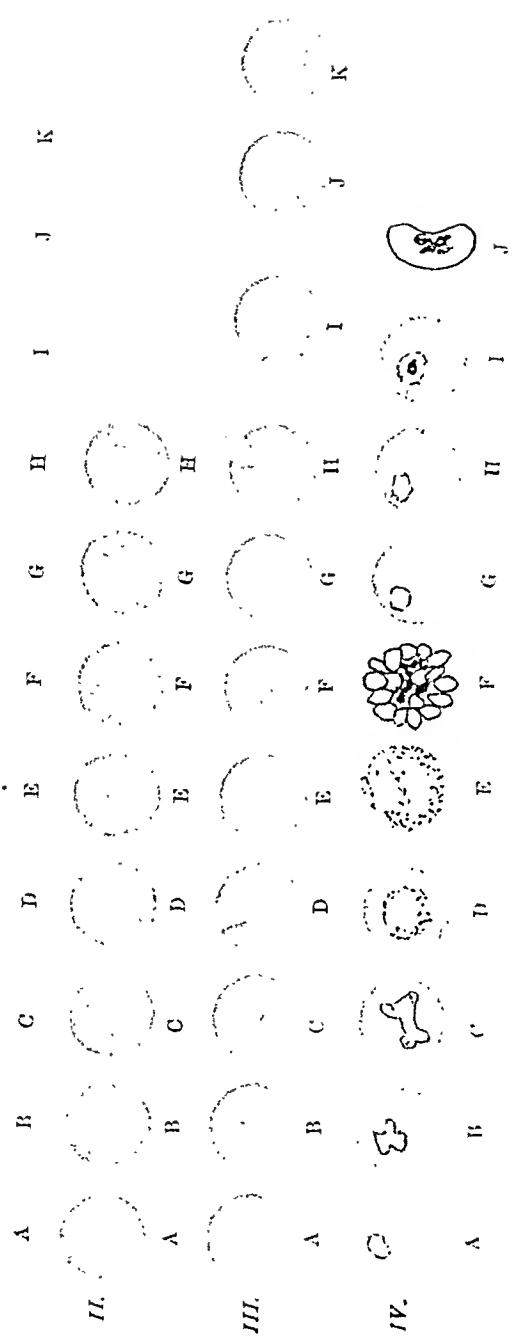
January 14, 1897. Temperature 103.5° F.

Red corpuscles	3,740,000 per c.mm.
Leucocytes	20,200 " "
Hæmoglobin	87 per cent.

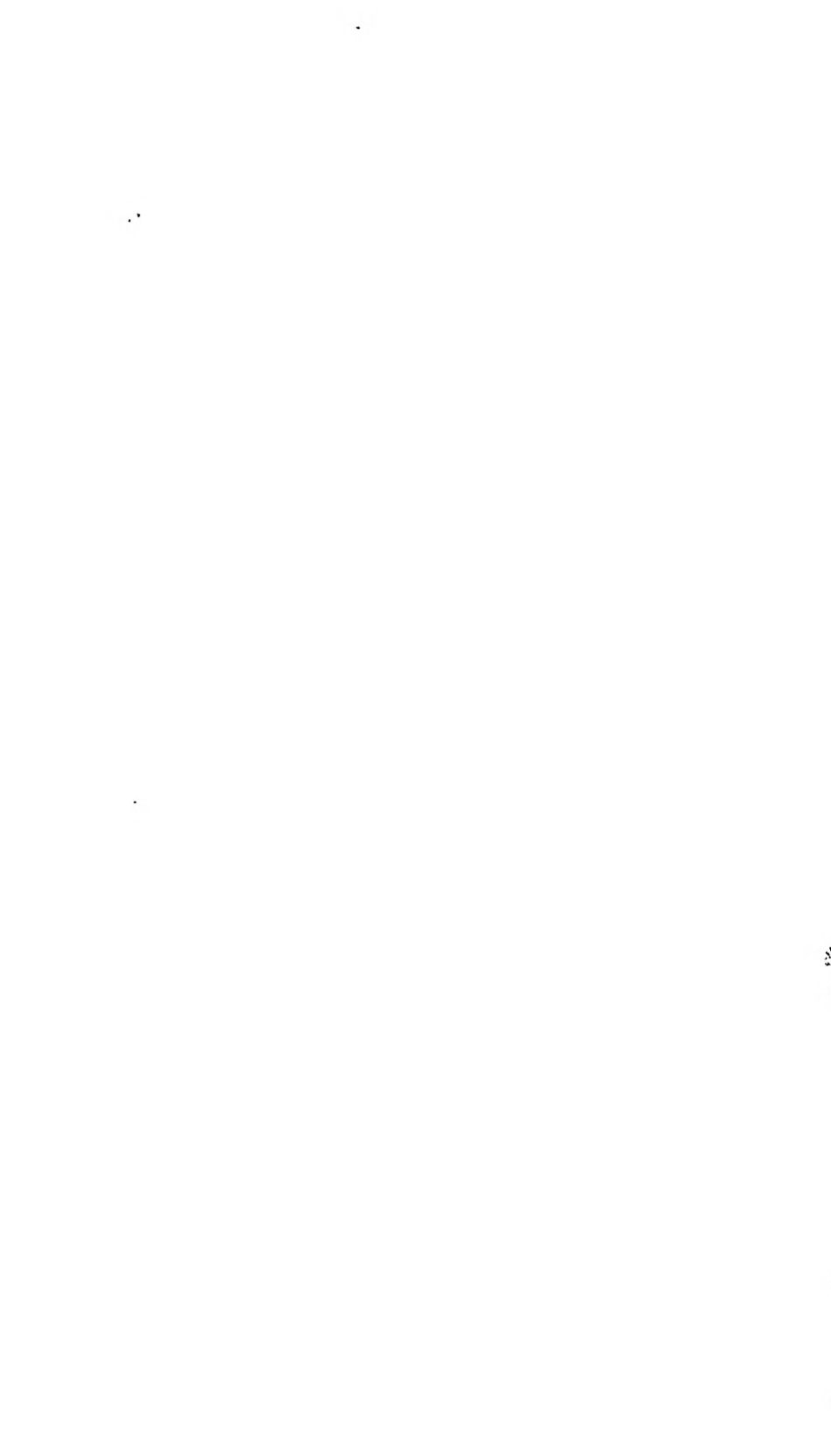
Examination of fresh specimens showed the red corpuscles to be fairly normal. No variations from the normal in size or shape were observed. (Poikilocytosis and schizocytosis respectively.) No pallor of centre of corpuscles. A well-marked leucocytosis was present. The corpuscles contained no blood pigment, nor was any observed free in the plasma. The blood plaques were apparently normal. In a large number (about one-tenth) of the red corpuscles there were observed bodies resembling markedly the intracellular hyaline forms of the malarial parasite. Certain differences were observed, however. Fully one-half these organisms or parasites were much larger than the intracellular hyaline forms of the malarial organism, as seen in the tertian and æstivo-autumnal types of that disease. No pigmented forms were observed. The larger forms were central in position, and took up fully one-half or more of the red corpuscle. The smaller forms were amœboid, but never to the degree seen in the malarial organisms. The bizarréd cross and chair forms, so common in tertian malarial fever, were never observed, nor the ring-like forms of æstivo-autumnal fever. These smaller forms were, as a rule, eccentric and peripheral. Their power of amœboid movement manifested itself in a slow change of shape from a circle to a square or five- or six-sided figure, and then back again. They move round within the red corpuscle, and in a few cases were seen to force out the cell-wall of the red corpuscle, into a small knob-like projection (*c*). In two cases the organism was seen to have partially escaped from the red corpuscle (*d*). These were probably not artefacts, as the corpuscles around were perfectly normal. The outline of these bodies was much fainter than that of an intracellular hyaline malarial organism. Nothing resembling the process of segmentation was observed, with the exception of one red corpuscle in which four of these organisms were seen, each one being amœboid (*e*). One specimen was ringed with vaseline and kept under the microscope for an hour, but nothing new was seen. No forms larger than two-thirds of the volume of the red corpuscle were seen. Both the forms which were observed in the act of escaping from the red corpuscles were of this size. It is just possible that this is a regular process, or that the corpuscles containing these larger forms remain within the spleen and segment there, as in the case of the organisms of æstivo-autumnal malarial fever.

Examination of dried specimens, hardened and stained by the various methods used in blood examination, showed these organisms to stain similarly to the malarial organism. The best results were obtained by hardening in equal parts of alcohol and ether for an hour, and staining with a dilute solution of gentian violet. No evidence of any nucleus was to be made out, even by using an apochromatic objective and high

I.



I. A to K. The parasite as seen in fresh specimens.
 II. A to H. The parasite as seen in specimens stained with Ehrlich-Biondi triple stain.
 III. A to K. The parasite as seen in specimens stained with eosin and methylene-blue.
 IV. A to F. The parasite of malarial fever of the tertian type as seen in fresh specimens.
 IV. G to J. The parasite of malarial fever of the activo-autumnal type as seen in fresh specimens.



eye-piece. Nothing further was to be made out in the stained specimens than has been already described under the head of the fresh specimens.

The red corpuscles containing the organisms showed no variations from the normal in staining, but a comparatively moderate number of polychromatophilic red corpuscles were observed, none of which contained the parasite. A differential count of one thousand leucocytes in a specimen stained with the Ehrlich-Biondi triple stain showed the leucocytosis to be due to an increase in the number of polynuclear neutrophilic forms, there being an absolute as well as relative diminution in the number of the small mononuclear forms. The eosinophilous forms were also markedly diminished in number, as we would expect to find in a case of fever of such long duration as the present one.

Polynuclears, 91.4 per cent.; large mononuclears, 5.3 per cent.; small mononuclears, 3.2 per cent.; eosinophiles, 0.1 per cent.

No abnormal forms of leucocytes or red corpuscles were observed. (Myelocytes or nucleated red corpuscles, respectively.)

No new forms of the organism nor any morphological characters not already described were observed in any of the subsequent examinations. A culture on blood serum from the blood showed no growth of any kind.

15th, 8.30 P.M. Temperature 100.2° F.

Examination showed the organisms were much fewer in number, the proportion being about one-half as many as were seen on the previous day.

17th, 12 M. Temperature 101° F.

The organisms in the blood were almost as numerous as on the 14th.

19th, 4 P.M. Temperature 102° F.

Result of the examination as on January 14th.

24th, 9 A.M. Temperature 98.5° F.

Very few parasites were observed in the blood, and all those seen were of the smaller variety.

27th, 12 M. Temperature 101° F.

Red corpuscles	4,240,000 per c.mm.
Leucocytes	12,800 " "
Hæmoglobin	93 per cent.

Examination showed the parasites to be distinctly less numerous than they were at the same hour on January 17th—ten days previously. This coincided with the distinct improvement of the patient during that time. The range of the fever had been lower, and she was distinctly less anæmic, as shown by the increase of 500,000 per c.mm. in red corpuscles, and of 6 per cent. in the hæmoglobin. A differential count of the leucocytes showed that the number of the various forms had returned almost to their normal relative proportions.

Polynuclears, 81.4 per cent.; large mononuclears, 3.6 per cent.; small mononuclears, 14.8 per cent.; eosinophiles, 0.2 per cent.

The number of the eosinophiles still remains diminished, however.

February 5th, 2 P.M. Temperature 100.1° F.

Since February 1st the patient has been taking ten grains of sulphate of quinine—fifty-five grains in all. The number of organisms was fewer than at the same hour on other days, one being seen in about every two fields of the microscope.

We have here in the blood a parasite resembling somewhat the youngest forms of the organisms seen in the two types of malarial fever prevailing in this country. It differs from them in certain important particulars. It is found in the blood in the largest numbers during the height of the febrile paroxysm. In malarial fever the young intracellular hyaline forms of organism are not abundant until some hours after the height of the febrile paroxysm—*i. e.*, until sufficient time has elapsed after segmentation for the young parasites to penetrate the red blood-corpuscles. The time-cycle is shorter with this parasite than in the forms of malarial fever prevalent in this country. In the fevers of the tertian and double tertian (quotidian) type the time-cycle (*i. e.*, the time it takes the organism to go through all the stages of its development and begin anew) is about forty-eight hours. In æstivo-autumnal fever the time-cycle is about thirty-six hours, and in quartan fever about seventy-two hours. This parasite is resistant to quinine, while the younger forms of the malarial organism are very susceptible to it. Other differences are the larger size of this parasite, its freedom from pigment, its comparatively feeble power of amœboid movement, absence of segmentation, fainter outline, and absence of the characteristic forms of the malarial organism as we know it in this country. (Bizarre forms, ring-like forms, crescents, etc.) The case could only have been confused with one of the æstivo-autumnal or fall type of malarial fever, as a case of tertian malaria would have shown the larger pigmented forms of the organism, and a case of æstivo-autumnal malarial fever of such long duration would, in all probability, show the so-called crescentic bodies.

CHARACTERISTICS.—In this case there was a period of fever lasting four weeks and followed by an interval of three days of freedom from fever. Then there was a second run of fever, more severe than the first, and lasting four weeks, the morning temperature being 102.5° F., and the evening temperature 104° F. This was followed by freedom from fever for three weeks, and then a recurrence, beginning October 1, 1896, and lasting persistently until January, 1897—indeed, until the latter part of April, 1897, the time when the patient was last observed. At first the fever was of a remittent type; later it changed to intermittent. It seems to have been resistant to quinine. No pigment was found in the blood plasma nor in the corpuscles. It should be stated, however, that no blood was taken from the spleen for examination. It was thought wise not to puncture the spleen, as the latter was not enlarged. There was no marked degeneration of the blood-corpuscles. The attack has now lasted more than ten months. Since the patient's arrival in New York, although she has had fever to a greater or less extent every day, she has enjoyed a fair degree of health—has, indeed, constantly improved in her general health.

While it must be admitted that the organisms, as shown in the accom-

panying plate, resemble very closely some of the forms of malarial organisms, there are many features about the case which would suggest that it is not malarial in its origin. Observers in the Levant have looked upon this type of fever as malarial, notwithstanding its marked resistance to quinine; but the fact that there is no pigment found in the blood plasma or in the corpuseles; that it is resistant to quinine; that no marked degeneration of corpuseles is produced, such as we see in malarial fevers in this country, and no enlargement of the spleen, would suggest more than a doubt of its being of malarial origin. It will be observed that although she had lived in a malarious region in Southern Iowa up to the time of her marriage, and that various members of her family there had suffered from malarial manifestations, she had never had any such manifestation until she went to Syria to live.

LITERATURE.—A careful search through the literature of the fevers occurring in the Levant, or countries bordering on the Mediterranean Sea, shows the greatest confusion of ideas among the various observers.

Should we judge by the nomenclature, we would say that these countries suffer from a larger variety of fevers than any other part of the world, for besides typhoid, typhus, and malarial fevers, which are all prevalent in those countries, mention is made of Malta, Neapolitan, Levant, Gibraltar, Rock, and Mediterranean fevers. No two articles on the same fever agree, for, where one man may be describing typhus fever, another may be describing malarial fever; and the same name is often used for different diseases. For instance, the attending physician of the case here reported stated that he has seen several such cases, and that it is known as Levant fever; but in the *Index Catalogue* of the Army Medical Library Levant fever is classified under the head of typhus fever. The bubonic plague is also sometimes known as the Levantine disease or plague, thus adding another source of confusion, so that we must be content with such reports as correspond to the case in question. Undoubtedly most of the cases of fever bearing the name of a given locality fall under the head of typhoid, typhus, or malarial fever. But that a fourth variety of continued fever occurs is well shown in the excellent articles of Bruce¹ and Hughes,² and it is to this variety of continued fever that the case here reported may probably be ascribed.

The articles of Bruce may be abstracted as follows: He saw at Malta many cases of what he terms "Mediterranean fever," presenting the following characteristics: it is a subacute, infectious, non-contagious disease, characterized clinically by fever, sweats, constipation, and frequent relapses. It is usually accompanied or followed by severe rheumatoid or neuralgic pains, with redness, tenderness, and swelling of the various

¹ Bruce: *Annales de l'Inst. Pasteur*, 1893, vol. vii. p. 283.

² Hughes: *ibid.*, p. 628. *Lancet*, London, December 3, 1892.

joints. The spleen is large and soft. As the disease progresses, anaemia develops. The disease prevails during the summer months. The mortality is not high, the death-rate being about 2 per cent. of all cases. There is general malaise, headache, etc., for eight to ten days, when the temperature rises gradually, taking three or four days to reach its maximum, after which it runs a course of a remittent type, falling to 100° F. in the morning hours, and rising to 103° and 104° F. in the afternoons.

The fever generally lasts one month, the temperature gradually falling to normal, where it remains about three days, when the same course of events repeats itself. This is repeated three or four times, the patients being in the hospital for three months or more. The disease may last six months or a year. The fever is but little influenced by quinine or arsenic beyond the temporary antipyretic effect of large doses of the former. The plasmodium of malaria is not present; there are no rose-spots or tympanites; and on post-mortem the Peyer's patches are found to be unaffected. Bruce has found in the spleen a micrococcus (*m. melitensis*) which he holds to be the cause of the disease. Monkeys injected with cultures of this organism showed a typical rise of temperature and continued fever, lasting some months, and the micrococcus was found in the spleen and internal organs on autopsy.

Hughes confirms these statements of Bruce. He says the disease is characterized by intermittent waves of pyrexia of a remittent type—one to three weeks of fever, and two to three days' interval. In rare cases these remissions are so marked as to take the form of intermissions, with a sharp rise of temperature in the morning and a gradual fall at night. The disease does not confer immunity against a second attack, and several instances of typhoid following it were observed. Hughes also finds the *m. melitensis* constantly associated with the disease, but does not believe it to be the actual cause.

THE POSSIBILITIES AND LIMITATIONS OF FORMALDEHYDE AS A DISINFECTANT.

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DURING the past two years the disinfectant properties of formaldehyde gas have been the subject of investigation by a number of experimenters, whose results have been by no means uniform. While all agree as to the undoubted value of the agent as a surface disinfectant, there is a wide variance of opinion as to its power of penetration, some finding it to be slight or even wanting, some reporting it to be considerable, and some, perhaps carried away by enthusiasm, asserting that it

is extraordinary. Some reports betray such a bias in favor of a particular apparatus as to suggest that their authors have lost sight of the fact that the germicidal power rests in the gas itself and not in the particular apparatus or lamp by which it is set free. Consideration of the expense attending its use as a practical disinfectant for general use has led to the invention of a number of lamps designed to bring about the desired results as conveniently and economically as possible, and as the importance of the agent becomes more generally recognized, and brings about a consequent increased demand, it seems probable that at no distant day inevitable business competition and stimulated inventive genius will result in a considerable cheapening of the process of manufacture of the agent and in the production of apparatus for its economical dissemination. At present its use on a large scale is beyond question expensive, no matter what process is employed, and certain of the processes, which have been recommended, are undeniably wasteful of material.

The experiments here recorded were undertaken to determine the possibilities and limitations of formaldehyde without especial consideration of the economical aspect of the question. The especial points were:

1. The efficiency of formaldehyde as a general disinfectant.
2. Its penetrating power.
3. The amount necessary in a given air-space for the destruction of different micro-organisms.
4. Its action on higher organisms.

The experiments were conducted in two of the surgical operating rooms and in the pathological laboratory of the Boston City Hospital, where every facility was afforded me by Prof. William T. Councilman, pathologist to the hospital. I received much valuable assistance from Dr. Richard M. Pearce, first assistant in the laboratory, to whom my grateful acknowledgments are due. The cultures regularly employed were *staphylococcus aureus*, typhoid, anthrax spores, and a non-pathogenic spore-bearing bacillus; others were occasionally employed, as will be noted. The non-pathogenic spore-bearer has not yet been absolutely identified, and hence will be designated here simply "non-path. spore-bearer." It is a bacillus about as large as anthrax, but with a large oval spore, grows profusely at room temperature and at 37.5°, liquefies blood-serum and gelatin, produces a grayish-yellow growth on agar-agar, a profuse white growth on potato, and slight diffuse clouding of bouillon, produces acid, but no gas, is not motile, and is not always killed by fractional sterilization for forty-five minutes on three successive days. It is non-pathogenic for rabbits and guinea-pigs.

All cultures used, excepting those of the spore-bearers, were from twenty-four to forty-eight hours old, and were made on blood-serum or bouillon; those of the spore-bearers were from four to ten days old. All

tests were made on blood-serum or bouillon, and all reported as negative were so at the end of seventy-two hours.

The first experiment was made in a room 26.75 feet long, 19.75 wide, and 14.50 high, thus having a capacity of 7660.5 cubic feet. The single door is in a corner away from the windows, which are three in number and all on one side. Along that side runs a work-table provided with drawers. On the side opposite, about in the middle, is a hood with a good ventilating flue, and in the hood stands a thermostat. In either transverse half of the room, well away from the walls, stands a desk eight feet long, five feet wide, and three feet eight inches high, provided with drawers and lockers with shelves. That nearest the door will be designated "Desk A," the other, "Desk B." The spaces between the windows are equipped with shelves, the three upper and lowest of which in each place are 1 foot 4 inches, 2 feet 9 inches, 4 feet 2 inches, and 9 feet 9 inches, respectively, from the ceiling. The outlets for ventilation other than the one in the hood are two in number and in the same wall. All three were closed during the experiment, but only by means of the registers, which are by no means air-tight.

The tests employed were as follows:

On Desk A: 250 c.c. typhoid infected milk in a quart pitcher; bismut smeared with typhoid (bouillon culture) and tied up in a napkin; anthrax spores inside a small pear; smears of anthrax spores, typhoid, and non-path. spore-bearer on paper (exposed); same and one of diphtheria (throat culture) in thin blank-books; smear of *staphylococcus aureus* inside thin blank-book near binding (book tightly closed); two rabbits in a wire cage, one with anthrax spores, the other with non-path. spore-bearer smeared on the head.

On Desk B: Typhoid infected sheet and blanket tied up in a clean sheet; typhoid stool in a basin covered with a towel; two dressings (twenty-four hours old) from an empyema; dressing (seventeen hours old) from an abdominal wound; dressing from fecal fistula (corrosive and iodol; on three hours); one uncovered and five covered Petri dishes containing water with an abundance of water bacteria; two uncovered Petri dishes containing pond water and sour milk in thin layers; racks containing cotton-stoppered test-tubes of bouillon and cultures of typhoid, diphtheria, *staphylococcus albus* and *aureus*, and non-path. spore-bearer.

In thermostat: Cotton-stoppered tubes of diphtheria and anthrax spores and exposed smears of the same on paper.

In covered galvanized iron barrel eight feet to the side of door: Lot of surgical dressings, including one from a septic compound fracture of the tibia, wrapped in paper and cotton.

In order to have other than bacteriological tests of the diffusion of the gas, thirty-three Erlenmeyer flasks containing decolorized fuchsin

solution and stoppered with cotton were placed in various parts of the room, as follows: On each of the three upper shelves of each tier, at the top of the lower sash of each window, in and on an air-bath fixed to the end wall, in two slop-jars under the desks at the windows, in two closed eupboards under desk B, in five closed drawers in desk B, on desk B next to the typhoid stool, on top and at the side of the rabbit cage, next to pitcher and pear on desk A, in a slop-jar under the sink next to the hood, on the upper and lower shelves over the same, in and on the thermostat, in an open tin box next to the hood and six feet from the floor, in the barrel, and in the lower drawer of the end desk by the windows. A control flask was placed in another room. This solution, which is made by passing a stream of sulphurous acid gas through a dilute solution of fuchsin (1:1000) until the color is discharged, I had found to be extremely sensitive to the presence of formaldehyde gas in the air even when contained in flasks plugged with cotton as in bacteriological work. A very small trace of formaldehyde in the air is sufficient to more or less completely restore the original color.

The room was closed, the crack under the door stopped with wet cotton, and the gas introduced through a fine tube which passed through the keyhole. The apparatus used was the lamp manufactured by the Sanitary Construction Company, in which the so-called formalin (40 per cent. solution) is slowly admitted to a heated spiral tube and vaporized. In the tank of the apparatus, at the beginning of the experiment, was 2400 c.c. formalin. As the lamp worked badly, the gas was given off very slowly, and finally, owing to persistent clogging of the tube, its use was abandoned until the next morning. On measuring the formalin left in the tank, it was found that but 650 c.c. had been consumed. On the following morning, after an interval of fifteen hours, the room was opened and aired. Cultures were taken as follows:

1. Smear of non-path. spore-bearer on desk A.
2. Typhoid feces.
3. Typhoid milk.
4. Diphtheria (closed tube).
5. Typhoid (closed tube).
6. Anthrax spores (closed tube).
7. Non-path. spore-bearer (closed tube).
8. Dust from lower shelf.
9. Diphtheria throat culture in blank-book.
10. Smear of typhoid in blank-book.

Examination of the Erlenmeyer flasks showed slight restoration of color in the contents of those on the six shelves between the windows, in the slop-jar, on the shelves over the sink, in the thermostat, on desk B near typhoid stool, on desk A near the milk-pitcher, in the barrel, over the middle window, and in two of the drawers of desk B. In the

flask on the thermostat in the hood, near the outlet flue, the register of which as stated was closed but not hermetically, the color of the solution had been almost completely restored. The fluid in the other flasks was unchanged in appearance.

The rabbits, which soon after the beginning of the experiment had shown signs of discomfort, appeared to be not much affected, although frequent observation through the transom over the door had led to a different prognosis.

The room was again closed as before, and the lamp, which had been put in order, was again applied, and the experiment resumed. The tank contained 2550 c.c. formalin, and when the apparatus was removed all but 400 c.c. had been consumed. On the following morning, after the same exposure as before, the room was opened and quickly aired. On entering the room, the atmosphere was almost unbearably irritating to the eyes and nose, and one of those who entered suffered several days from a severe coryza thus induced. Contrary to what was to have been expected from the experience of Pfuhl, Aronson, Rosenberg, and others, one of the rabbits was dead, and the other was breathing through the mouth with great difficulty. This one improved noticeably within the next two hours, but died thirty-six hours later.

Examination of the flasks containing decolorized fuchsin solution showed that with one exception the color of the liquid had been more or less completely restored. Those showing the greatest intensity of action were as follows: On the six shelves between the windows, at the tops of the lower sashes, in and on the thermostat, in the tin box next to the hood. In these cases the color was completely restored. Those showing the least action were in the drawers and cupboards; their color was light amethyst. The remaining flasks, wherever placed, showed a color of greater or less depth between these extremes. The one flask showing no change was on desk A, and examination showed that its stopper was much more tightly compressed than any of the others. The control flask was unchanged. Cultures were made from the following:

1. Smear of anthrax spores on desk A.
2. Smear of typhoid spores on desk A.
3. Smear of non-path. spore-bearer on desk A.
4. Smear of diphtheria in blank-book.
5. Smear of typhoid in blank-book.
6. Smear of anthrax spores in blank-book.
7. Smear of non-path. spore-bearer in blank-book.
8. Biscuit (typhoid smear) in napkin.
9. Uncovered Petri dish of water.
10. Uncovered Petri dish of pond water.
11. Uncovered Petri dish of sour milk.
12. Water standing in the sink (shallow).

13. Dust in crack of floor farthest from door.
14. Dust in crack of floor near door.
15. Dust on lowest shelf between windows.
16. Dust in cupboard of desk B.
17. Dust in drawer of desk B.
18. Fluid on bottom of refuse pail.
19. Material on bottom of slop-jar No. 3 (dry).
20. Fecal fistula dressing on desk B.
21. Anthrax spores in hair of rabbit.
22. Non-path. spore-bearer in hair of rabbit.
23. Dried feces of rabbit.
24. Mouth of live rabbit.
25. Nares of dead rabbit.
26. Tongue of dead rabbit.
27. Lung of dead rabbit.

From none of the above was there any growth in seventy-two hours. Cultures from the following showed growth:

1. Dressing from empyema on desk B.
2. Dressing from abdominal wound on desk B.
3. Dressing from septic fracture in barrel.
4. Typhoid sheet and blanket tied in clean sheet.
5. Typhoid feces in basin covered with towel.
- 6, 7. Closed tubes of anthrax and diphtheria in thermostat.
- 8, 9. Paper smears of anthrax and diphtheria in thermostat.
10. Typhoid infected milk in pitcher.
11. Pear containing anthrax.
12. Smear of staphylococcus aureus in tightly closed book.
- 13, 14. Closed typhoid bouillon tubes.
- 15, 16, 17. Closed tubes of staphylococcus aureus and albus, and diphtheria.
18. Closed tube of typhoid on blood serum.
19. Slop-jar No. 1, containing water.
20. Slop-jar No. 2, dry (non-path. spore-bearer).
21. Galvanized iron barrel (covered).
- 22, 23, 24, 25, 26. Covered Petri dishes.
27. Dust on top shelf (spores).
28. Nares of live rabbit (spores).
29. Small intestine of rabbit.
30. Large intestine of rabbit.
31. Stomach of rabbit (three colonies of a spore-bearing bacillus).

The cultures taken before the second application of the gas showed good growths, except in the case of the smears of diphtheria and typhoid, which were sterile.

Autopsy of the rabbit which was found dead showed great hyperæmia

and increased moisture of the respiratory passages and congestion of the lungs. The other rabbit was found dead thirty-six hours later. The autopsy showed the same conditions of the respiratory passages and an irregular solidification of about two-thirds of the right lung and about one-half of the left, with increase of fluid in the pleural cavity. Cultures from the solidified portions of the lungs yielded no growth.¹

The next experiment was conducted in a room 33 feet long, 22.5 wide and 14.5 high, thus having a capacity of 10,766 cubic feet. Three sides of the room contain seven windows, each of which is seven feet wide and ten and a half high. In the fourth side are a single and a double door. Ventilation is provided for by four outlets closed by registers, two of which are 2 feet 2 inches by 1 foot 10 inches, the other two just half as large. Two desks, similar in size to those in the room in which the first experiment was conducted, stand on the floor in similar positions. Experiments on a small scale with flasks and test-tubes having demonstrated that formalin diluted with water can be evaporated by direct application of heat without polymerization, it was determined to try this simple means on a larger scale, with the idea that it would be possible to do away with the use of expensive apparatus.

The test objects used were as follows:

Smears of anthrax spores, diphtheria, and non-path. spore-bearer on paper placed on the desks; smears of anthrax spores and staphylococcus aureus in the desk drawers; closed tubes of diphtheria and anthrax, and open tubes of staphylococcus aureus, anthrax, and non-path. spore-bearer on the desks; surgical dressings wrapped in paper and in cotton on the

¹ Since the above was written the organs of the two rabbits have been further examined. The following description of them is taken from the records of the laboratory.

No. 1. Section of the tongue shows nothing abnormal. Section of mucous membrane of the mouth shows desquamation of the surface epithelium with hemorrhage and infiltration, with lymphoid cells in the tissue beneath. Section of oesophagus is normal. There is no pneumonia. The liver shows marked injection, with granular and fatty degeneration of cells around the central veins of lobules. The lymphatic gland shows some dilatation of the lymph sinuses with hemorrhage. In the kidney there is slight degeneration of the epithelium.

No. 2. In the liver there is considerable dilatation of hepatic veins, with some degeneration of liver cells in the centre of the lobules. The kidney is congested. The epithelium of the convoluted tubules is somewhat swollen and granular, and there is a small amount of coagulated albumin in the capsular space of the glomeruli. In many of the convoluted tubules there is more or less granular and circular reticulum, and, in places, desquamation of the cells. The spleen shows a slight amount of hemorrhage in the pulp. Pancreas shows no change. One of the lymphatic glands shows a marked degree of edema, with formation of fibrin in the lymph sinuses. In the lung there is intense bronchitis with consolidation extending into the surrounding lung tissue. This is more marked in the very smallest bronchi. In one place, in the centre of a focus, there are numbers of short bacilli. The exudation of the alveoli is almost entirely purulent, with some large cells mixed with pus. In another place in the tissue there were numbers of large bacilli. There is only a slight amount of fibrin in the exudation. In another portion of the lung there were very much larger foci which were filled with organisms. All the bloodvessels of the lung are greatly injected.

It is difficult to explain the absence of bacteria in the cultures made from the lung in the second case. The general character of the lesions in both cases shows the action of a soluble chemical poison on the tissues. The changes are much more marked in the second case than in the first, but in both they are of the same general character.

desks; surgical dressings in a cupboard, and a blanket on which was part of a typhoid stool in another cupboard. A glass dish covered with wiregauze and containing a number of cockroaches was placed on one of the desks.

4250 c.c. of formalin was mixed with 3000 c.c. of water, and placed in an open copper cylinder of 10 litres capacity, provided with a glass gauge to show the height of the fluid in the cylinder. In order that this might more readily be observed from the transom, the formalin solution was slightly colored with fuchsin. Heat was applied by means of a small gas-stove, the regulation of which was provided for by having a loop of the rubber supply tube passed under the door into the hall. The registers were closed, the gas turned on and ignited, the doors closed, and the spaces beneath stopped with wet cotton. In four hours the gas was shut off, and the room was left unopened seventeen hours. On entering the room, it was evident that considerable natural ventilation had occurred, for the discomfort occasioned was but slight in comparison to that noted in the previous experiment. This result had, however, been foreshadowed by the readings of a wet and dry bulb hygrometer which had been placed near enough to the transom to admit of ready observation. At intervals of a half hour the readings were taken, and in spite of the volume of liquid that had been evaporated, there had been at no time any indication of increase in the degree of moisture in the air. The copper cylinder was found to contain 1200 c.c. of liquid which contained a large amount of polymerized formaldehyde. Of the test-objects employed, only two—the smears of diphtheria and non-path. spore-bearer—were found to have been sterilized.

The next experiment was conducted in a small room of 1500 cubic feet capacity, provided with one window, two doors, and two ventilating openings provided with registers. In this a Sehering lamp was employed with pastilles of polymerized formaldehyde. According to Aronson, the proper number of pastilles to be consumed would have been eighty-five, but, as a preliminary test, only twenty were employed, and the results showed that they were quite insufficient. The test-objects employed were smears of typhoid, staphylococcus aureus, anthrax spores, and non-path. spore-bearer on paper, four surgical dressings, and a smear of diplococcus intracellularis meningitidis. After eighteen hours' exposure, all but the last-mentioned showed abundant growths.

The next experiment was conducted in one of the surgical operating-rooms of the hospital, of 4560 cubic feet capacity (19 x 15 x 16). One side of this room is chiefly windows provided with double sashes; on the opposite side is the door, on either side of which is a bandage-closet and a drug-closet provided with glass doors. In the middle of the room is a chandelier provided with reflectors. The Sehering lamp was again tried, this time with half the number of pastilles recommended—that

is, with 130. Before the lamp, which was filled with 250 c.c. of alcohol, was lighted, cultures of dust were taken in bouillon as follows:

1. Bandage-closet.
2. Dead fly on window-ledge.
3. Floor near operating-table.
4. Floor near window.
5. Top of marble ledge at window.
6. Crack between water-pipe and floor.
7. Reflector of chandelier.
8. Inlet for heated air under window.

A culture was taken also from a surgical dressing. All gave abundant growths.

Test-objects, consisting of smears of anthrax spores, staphylococcus aureus, typhoid, and non-path. spore-bearer on paper were placed on a table near the centre of the room.

The lamp was lighted, and the door closed. The space under the door was stopped with wet cotton, and the keyhole covered with a gummed label. After twenty-one hours, the room was opened, and, at first, the atmosphere was unbearable. As soon as possible, cultures were taken from the same places as before and from the exposed smears. Dust from the marble ledge and from the bandage-closet, the door of which had been closed, yielded abundant growths, as did also a culture from the dead fly. Dust from the reflector, from the floor near the window, and from the inlet for heated air showed slight growth. Dust from the floor near the wall and under the operating-table, the dressing in a pail, and the paper smears were sterile.

Two Petri plates exposed for twenty minutes after airing the rooms gave the following results:

1. Plate on table at side of room :
 - 1 colony of a short bacillus.
 - 1 colony of staphylococcus aureus.
 - 2 colonies of staphylococcus albus.
 - 3 colonies of a large yellow coccus.
2. Plate on table in corner of room :
 - 1 colony of a brown mould.
 - 1 colony of a short bacillus.
 - 1 colony of a large yellow coccus.
 - 1 colony of staphylococcus albus.

The next experiment was conducted in an exactly similar adjoining room with two Schering lamps, each carrying 130 pastilles. It is to be explained in passing that at this time the surgeons were experiencing more or less trouble from pus formation after operations, which was attributed to extensive alterations near by involving the tearing up of some old wood flooring which had been down many years, and causing

much dust. Before the lamps were lighted, three Petri plates were exposed for twenty-five minutes, with the following results:

Plate on sink at side of room:

- 43 colonies of non-pathogenic organisms.
- 37 colonies of *staphylococcus albus*.
- 4 colonies of *staphylococcus aureus*.
- 2 colonies of *staphylococcus citreus*.

Plate on operating-table at centre of room:

- 79 colonies of non-pathogenic organisms.
- 6 colonies of *staphylococcus aureus*.
- 39 colonies of *staphylococcus albus*.

Plate on instrument-table at corner of room:

- 26 colonies of non-pathogenic organisms.
- 4 colonies of *staphylococcus aureus*.
- 23 colonies of *staphylococcus albus*.

Before the experiment was begun, dust-cultures, which yielded abundant growths, were taken from the following:

1. Table at side of room.
2. Reflector.
3. Bandage-closet.
4. Floor near window.
5. Floor under operating-table.
6. Crack under water-pipe.
7. Floor at corner of room.
8. Inlet for heated air under window.
9. Marble ledge over sink.

Test-objects were introduced as follows: Smears prepared on papers each of which bore anthrax spores, non-path. spore-bearer, *staphylococcus aureus*, and typhoid, were encased in small bags made of cotton such as is used in the manufacture of flour-bags. This cotton is very heavily sized, and the bags made from it may readily be filled with water, which then runs through with marked slowness. On being boiled in water, the sizing is removed, and they are then quite pervious. Both forms, boiled and unboiled, were used. After the smears were introduced, the open ends of the bags were twisted and securely tied. Smears in one bag of each kind were placed on a glass shelf at the side of the room, in the inlet for heated air under the window, and on the reflector of the chandelier. Smears of the same four organisms were placed in Erlenmeyer flasks and distributed as follows: Two were placed inside a hair mattress well into the hair, the openings by which they were introduced being then securely closed. One was placed in the bandage-closet, the door of which was closed, and another, plugged with cotton, in the drug-closet, the door of which was left open. In addition to the above, a slightly moist dressing and a wet, bloody dress-

ing encased in unboiled bags were placed on a table near the window in company with similar dressings in boiled bags. A rack containing stoppered and open serum-tubes was also left on a table.

The lamps were lighted, and the room closed as before. After twenty hours' exposure the door was opened, and, as soon as practicable, three Petri plates were exposed twenty-five minutes, as before the experiment and in the same situations. On one, two colonies of mould developed; the others were quite free from growths.

Dust-cultures taken from the same places as before were sterile, with the exception of slight growths of moulds, non-pathogenic bacilli, and a few cocci, which were obtained from the floor at the corner of the room and in the closed bandage-closet. The smears in all the boiled and unboiled bags and the slightly moist dressings in both bags were sterile. The wet bloody dressings both showed abundant growths. The smears in flasks in the mattress were both sterile as to typhoid and staphylococcus aureus, but not so as to anthrax spores and the non-path. spore-bearer. The smear in the flask in the closed bandage-closet gave growths of all four organisms, while the one in the plugged flask in the open drug-closet was sterile as to typhoid and staphylococcus aureus. Flasks containing decolorized fuchsin solution, which were placed alongside the test-objects and plugged with cotton, all showed evidence of the chemical action of the gas, excepting the one in the bandage-closet, where nothing was sterilized. The closed serum-tubes, after exposure, were inoculated with diphtheria and staphylococcus aureus and albus, and showed good growths, while the open tubes, similarly planted, showed only slight growths at the level of the water of condensation.

After a lapse of a week, the experiment was repeated in the same room, using the same lamps and the same number of pastilles, but without the introduction of extra test-objects. Dust cultures made from the same places as before showed abundant growths, with the exception of the one from the crack under the water-pipe which gave no results. An additional culture from the drug-closet also gave negative results. After an exposure of similar length of time, cultures were again taken, and all were sterile, excepting that the one from the closed bandage-closet yielded a very slight growth.

During and after the time in which the foregoing experiments were conducted, a series of experiments was carried on in small air-spaces to determine the amount of formaldehyde and the length of exposure required for the sterilization of the various organisms which have been employed, and which may be taken as proper representatives of all pathogenic and non-pathogenic bacteria. Two pieces of apparatus were employed: one, a nearly globular glass bell-jar of 7500 c.c. capacity with an opening at the bottom sufficiently large to admit the

hand, and capable of being hermetically sealed with a greased ground-glass plate, and with two small openings in the sides, one of which served to connect with a test-tube, and the other to be provided with a valve to allow for expansion; the other, a nearly cubical glass case of 201,500 c.e. capacity, provided with a hinged opening at the lower edge of one side two inches in height, and with a small inlet connected, by means of a glass tube and perforated rubber stoppers, with a small glass flask in which the disinfectant could be placed for vaporization by means of a lamp. The results obtained with the small apparatus were in entire agreement with those obtained with the larger, and I will, therefore, not take up space to set them forth. In each experiment the formalin was diluted with a small amount of water in order to insure complete volatilization without polymerization.

Experiments in Glass Cabinet.

Experiment 1.—Test-objects: Smears of diphtheria, typhoid, anthrax spores, non-path. spore-bearer, and staphylococcus aureus; two surgical dressings. Amount of formalin used, 10 c.e. Exposure, four hours. Results: All smears, and cultures from outside layers of dressings, sterile; cultures from inside layers, not sterile.

Experiment 2.—Test-objects: Smears as before. Amount used, 5 c.e. Exposure, four hours. Results, all sterile.

Experiment 3.—Test-objects: Smears as before, excepting diphtheria, and same smears in boiled and unboiled bags. Amount used, 5 c.e. Duration, one, two, three, and four hours for exposed smears, two and four hours for smears in bags. Results: Smears at one, two, three, and four hours, all sterile. Smears in bags at two and four hours, all sterile, except that the smears of anthrax in the boiled and unboiled bags withdrawn at the end of four hours yielded respectively one and three colonies. This last result admits of conjecture, but not of explanation.

Experiment 4.—Test-objects as in Experiment 3. Amount used, 4 c.e. Duration, fifteen and thirty minutes for exposed smears; two and four hours for smears in bags. Results: Smears after fifteen minutes, typhoid and staphylococcus aureus sterile; after thirty minutes, all sterile except non-pathogenic spore-bearer. Smears in bags after two and four hours, all sterile.

Experiment 5.—Test-objects same as in Experiments 3 and 4. Amount used, 3 c.e. Duration: for exposed smears, fifteen, thirty, and forty-five minutes; for smears in bags, one and one-half and two and one-half hours. Results: Smears after fifteen minutes, sterile, excepting non-path. spore-bearer; after thirty and forty-five minutes, all sterile. Smears in bags after one and one-half and two and one-half hours, all sterile. A fly, which, during the airing of the cabinet after Experiment 4, had entered the cabinet, was seen in this experiment to drop dead in fifteen minutes. A culture of the fly taken at the end of the experiment gave negative results.

Experiment 6.—Test-objects as in Experiments 3, 4, and 5. Amount used, 2 c.e. Duration: for exposed smears, fifteen, thirty, forty-five, and sixty minutes; for smears in bags, one, two, and three hours.

Results: Exposed smears, after fifteen minutes, none sterile; after thirty and forty-five minutes, typhoid sterile; after sixty minutes, all sterile except non-path. spore-bearer. Smears in bags: Boiled and unboiled bags at end of one hour, typhoid sterile. Unboiled bag at end of two hours, typhoid sterile; boiled bag, typhoid and staphylococcus aureus sterile.

Boiled and unboiled bags at end of three hours, all sterile except non-path. spore-bearer.

Experiment 7.—Test-objects: Smears on paper (none in bags). Amount used, 1 c.c. Exposure, two and one-half and four and one-half hours. Results: All sterile after both exposures.

Experiment 8.—Test-objects as in Experiment 7. Amount used, $\frac{1}{2}$ c.c. Exposure, two and one-half and four and one-half hours. Results: All sterile at both exposures. In this experiment, as in Experiment 5, a fly, which had entered the cabinet during the airing process, was found dead, but how long it survived was not noted.

Experiment 9.—This experiment was conducted with the object to determine whether or not it is possible to sterilize surgical dressings and liquid stools by means of any amount of formaldehyde which could be used practically on a large scale. A wet dressing and a liquid typhoid stool in a shallow pan were exposed to an amount of formaldehyde corresponding to one part of liquid formalin vaporized in 5000 volumes of air, that is, to 40 c.c. of formalin vaporized in a little over 200,000 volumes of air. Controls taken beforehand showed abundant growths. After eighteen hours' exposure, the typhoid stool was sterile, as were cultures from the upper layer of the dressing. Cultures from the lower layers of the same yielded abundant growths. At the same time, open and closed serum-tubes were exposed, which, after withdrawal after eighteen hours, were planted with diphtheria and staphylococcus albus. The closed tubes yielded fair growths; the others none.

CONCLUSIONS.—Formaldehyde has extraordinary power as a surface disinfectant, greater than that of any other known substance. It is not, however, absolutely thorough in all cases even as a surface disinfectant, as is shown by the results of the experiments in room-disinfection. Ordinary bacteria, and those of the highest resistance as well, when freely exposed to an atmosphere produced by vaporizing approximately 110 c.c. of formalin in each 1000 cubic feet of space, are killed within two and one-half hours (Experiment 8). An atmosphere produced by approximately 290 c.c. in each 1000 cubic feet will sterilize ordinary pathogenic bacteria, such as typhoid, staphylococcus aureus, etc., within a half-hour, and anthrax in from forty-five to sixty minutes, and will destroy typhoid protected by an envelope of cotton cloth in one hour, staphylococcus aureus similarly protected within two, and anthrax, also in cotton, within three hours (Experiment 6). An atmosphere of approximately 435 c.c. in each 1000 cubic feet, which would be in the proportion of about a quart to a room fifteen feet square and ten feet in height, will destroy all exposed organisms within a half hour, and others protected as above within an hour and a half (Experiment 5).

The penetrating power of the gas depends largely upon the conditions as to moisture. Through dry pervious substances, as cotton cloth, absorbent cotton, hair, etc., it appears to penetrate more or less easily, but not always in sufficient amount to exert germicidal action, as is shown by the results with the tube cultures and flasks of decolorized fuchsin, which were stoppered in exactly the same manner. In the presence of moisture the penetrating power is practically *nil*. The experiments can lead to but one conclusion, therefore, that formaldehyde must be regarded and employed as a surface disinfectant, and can never be anything else, in spite of its power of penetration under favorable conditions. This conclusion is in accord with that of Aronson,¹ Pfuhl,² Niemann,³ Bose,⁴ Roux and Trillat,⁵ and Vaillard and Lemoine.⁶

It has been asserted by a number of authors, among them Aronson, Pfuhl, and Rosenberg,⁷ that formaldehyde exerts no deleterious action on higher organisms. The results produced by the gas on the two rabbits used in the first experiment were sufficiently certain to demonstrate the falsity of this theory and to render further experiment on my part in this direction unnecessary. The experience of several others, who are daily engaged in the work of house disinfection, has shown that animals, such as dogs and cats, which have accidentally been confined in rooms undergoing formaldehyde disinfection, rarely survive the operation when the latter is properly carried out. On the other hand, the experience of these same persons is that insects, such as roaches, flies, and bedbugs, are not much affected. My observations in this direction have been limited to the cases of occasional flies, and one dish of cockroaches, all of which were killed.

¹ Ueber eine neue Methode zur Desinfection von grösseren Räumen mittels Formalin. *Zeitschrift für Hygiene*, xxv. 168.

² Untersuchungen ueber die Venwendbarkeit des Formaldehyd-gases zur Desinfection grösserer Räume. *Zeitschrift für Hygiene*, xxii. 339, and xxiv. 289.

³ Zur Desinfection von Wohnräumen mittels Formaldehyd. *Deutsche medicinische Wochenschrift*, No. 46, 1896.

⁴ Essais de désinfection par les vapeurs de formaldéhyde au moyen des procédés de M. Trillat. *Annales de l'Institut Pasteur*, May 25, 1896.

⁵ Essais de désinfection par les vapeurs de formaldéhyde. *Annales de l'Institut Pasteur*, 1896, 283.

⁶ Sur la désinfection par les vapeurs de formaldéhyde. *Annales de l'Institut Pasteur*, 1896, 481.

⁷ Ueber die Wirkungen des Formaldehyds im Holzin und Steriform. *Zeitschrift für Hygiene*, xxiv. 488.

REVIEWS.

A SYSTEM OF PRACTICAL MEDICINE BY AMERICAN AUTHORS. Edited by ALFRED LEE LOOMIS, M.D., LL.D., late Professor of Pathology and Practical Medicine in the New York University, and WILLIAM GILMAN THOMPSON, M.D., Professor of Materia Medica, Therapeutics, and Clinical Medicine in the New York University; Physician to the Presbyterian and Bellevue Hospitals, New York. Vol. II. Philadelphia and New York: Lea Brothers & Co., 1897.

THIS volume contains articles on the diseases of the respiratory system, circulatory system, mediastinum, blood, kidneys, bladder, and prostate gland. So many important subjects described by seventeen contributors obviously call for great skill in editing, as well as conciseness of diction. These requirements have rarely been neglected in the work before us. As usual, the sections are not all carried out in the same lines. Some are written from a strongly individual point of view, and often, as in the article on diseases of the kidneys, with a decided gain in freshness and interest and without loss in any other respect. Others are filled with learning from the most varied sources, and often make us wish the writers had given references for the statements they quote.

The short chapter on diseases of the nose, naso-pharynx, and larynx, by S. E. Solly, gives a readable and practically useful account of those conditions in brief compass. Tastes will differ as to the advisability of including in such a work articles on the physical signs of pulmonary disease and the examination of the heart. It may, indeed, be thought that those who use extensive "systems" are familiar with such propædæutic matters. Nevertheless, no one who reads Dr. Cutler's articles will find them other than able and valuable, and it would be well if they were studied with as much care as the various chapters on therapeutics and their prescriptions are likely to be.

Fibrinous pneumonia is always a specimen-subject in works on practice. In the present one it is in the able hands of Dr. R. H. Fitz, and the fact that it covers not quite twenty pages shows great power of compression. Osler, for example, in his single volume, has the same number of pages. Fitz's definition epitomizes the subject, and shows the strength of his stand-point so well that a quotation is better than description: "Pneumonia is an acute infectious disease due to the invasion of the lung by a variety of bacteria, oftenest by the *diplococcus pneumoniae*, Fraenkel's pneumococcus, and characterized by the production of a fibrinous inflammation of this organ, pursuing a more or less typical course, and manifested by a variety of symptoms in part due to the absorption of toxins from the lung." The remarks on treatment are full and sound, although the author seems to have had an unfortunate experience with the cold bath, and does not praise it as highly as we think it deserves.

Non-tubercular diseases of the pleura are well described by Herbert B. Whitney. Especially commendable are the remarks on the operative

treatment of empyema—a subject of great importance to all physicians, and especially to those who have not a surgeon within convenient reach.

The article on endocarditis, by the late senior editor, is characterized by the wide clinical knowledge and clear exposition of the lamented author. The articles on pericarditis and hypertrophy and dilatation of the heart have been well done by Dr. Warren Coleman, and Dr. Cutler has done equally well with cardiac atrophy, rupture, myocarditis, and the fat heart. The multiplication of authors on cardiac disease has led to some repetition, and, including Dr. Whittaker's characteristically complete chapters on neuroses of the heart and diseases of the bloodvessels, seems to give unusual space to these as compared with some other topics.

The chapter on diseases of the blood, by Drs. F. C. Shattuck and R. C. Cabot, is not only one of the best in the volume, but also one of the best available on the subject. We should think the sight of a man holding an hæmatocrit in his hand while using it would be much worse for a nervous patient than the noise of the machine. The authors mention this mode of use without recommending it.

We have already alluded to the excellent chapter on diseases of the kidney by Dr. H. P. Loomis. This is followed by one on pyelitis and renal calculus, by Dr. Danforth, who also treats of diseases of the bladder and prostate. Tyson describes abnormalities of form and position of the kidney and renal inadequacy with his usual thoroughness, and Dr. Coleman ends the volume with articles on abnormalities of the urine and uræmia.

The volume is well printed. It is remarkably free from errors of all kinds. In the article on cystitis, otherwise quite modern, there is a curious bit of misplaced pathology: "the epithelial cells undergo degeneration and disintegration which results in setting free their nuclei; the liberated nuclei now rapidly multiply, producing pus corpuscles." The directions for making the acetic acid and ferrocyanide test for albumin are not correct, and on page 820 "grains" appears, when "grammes" must have been intended. A strange appearance is given to the pages in some chapters by a remarkable use of quotation points.

The illustrations are more numerous than in the preceding volume. Many of them are very good; others, especially some from Lehmann's *Atlas*, suffer by comparison with those of native origin.

On the whole this volume, so far as its range of topics goes, is a worthy exponent of modern medicine. With so many subjects, a full review would far exceed the available space, and we have left unmentioned a number of chapters for this reason. The work is indispensable to the physician who wishes to keep abreast with the rapidly advancing current of general medicine.

G. D.

ATLAS OF CLINICAL MEDICINE. By BYRON BRAMWELL, M.D., F.R.C.P. Edin., F.R.S. Edin., Assistant Physician to the Edinburgh Royal Infirmary; Lecturer on the Principles and Practice of Medicine in the Extra-Academical School of Medicine, Edinburgh, etc. Vol. I. Edinburgh: University Press, 1892.

THIS work, thus far, consists of three superb folios, of which the first, as above stated, appeared in 1892; the second in 1893, and the third in

1896. It is very imperfectly designated by the term *Atlas*. It is a series of monographs upon a wide range of subjects of great practical interest, the word *Atlas* serving merely to indicate the fact that illustrations constitute its most striking feature. Although the illustrations are the most prominent, they are not the most important part of the *Atlas*. In fact, it is a question whether, by distracting the attention of the casual reader, they do not to some extent impair the value of the work. This remark is not intended to decry the value of illustrations in general, still less of these in particular, but is made with the object of emphasizing the writer's admiration of the text of this so-called *Atlas*. Without the illustrations the book would have a wide circulation, for where could one turn for better articles upon Myxædema, Hodgkin's disease, Addison's disease, Friedreich's ataxia, and many other subjects? With the illustrations, it leaves nothing to be desired.

There is one advantage, besides that of portraying disease, which is possessed by illustrations, and which makes them of inestimable value, and that is the truthfulness with which they represent its progress. A mere statement that a given disease is cured or ameliorated by a specific method of treatment is always open to the criticism that its advocate is prejudiced in its favor. Many a physician, after years of self-deception with reference to some favorite drug, can repeat with fervor the words of Cowper, and will do so publicly if he is an honest man :

"What ardently I wished, I long believed,
And disappointed still, was still deceived."

In Vol. III. of the *Atlas* there is a beautiful series of plates illustrating the remarkable effects of thyroid extract in the treatment of psoriasis and some other intractable diseases of the skin. No possible description in words could be so effective in teaching the value of this method of treatment.

There is a physiognomy of disease, whether physical or mental, that is recognized by the careful clinical observer, and is admirably portrayed in Bramwell's *Atlas*. In making this statement, no reference is intended to the beautiful pictures of cutaneous affections with which the work abounds, but rather to the representations of the human countenance as modified in color, expression, or shape, by disease of internal organs or by general infection. It is hard, amid such an *embarras de richesses*, to select the most appropriate examples. Suffice it to say, that every practitioner who has carefully observed a typical case of myxædema will find his patient most faithfully depicted in the *Atlas*. The same remark is applicable to the illustrations of acromegaly, congenital syphilis, cyanosis, Addison's disease, Hodgkin's disease, etc.

The wide range of subjects included in the *Atlas* has been already alluded to, and is one of its principal merits. The neurologist, the dermatologist, the syphilographer, and the ophthalmologist will each find abundant material concerning his specialty.

At the present time, on finding a practitioner thoroughly conversant with diseases of the nervous system or with those of the eye, it is naturally assumed that he is either a neurologist or an ophthalmologist. In the case of Dr. Bramwell, however, we find that he treats, in a masterly manner, not only of the diseases of the nervous system and of the eye, but also of those of the skin, the blood, the viscera ; in short, of all non-surgical affections ; and we are forced to the conclusion that

he is a general practitioner. We rejoice that the species is not extinct, and trust that in some environment other than that of Edinburgh, which seems to be the most favorable, it may increase and multiply.

The writer of this brief review could find no more congenial task than that of discussing, *seriatim*, the subjects treated of in this magnificent *Atlas*. He is, however, compelled to restrict himself to a general but most emphatic statement of its value to every student and practitioner. It should certainly be in every public medical library in this country and in the private collection of every practitioner who can afford to purchase it.

F. P. H.

CUTANEOUS MEDICINE, A SYSTEMATIC TREATISE ON THE DISEASES OF THE SKIN. By LOUIS A. DUHRING, M.D., Professor of Diseases of the Skin in the University of Pennsylvania; author of *A Practical Treatise on Diseases of the Skin* and *Atlas of Skin Diseases*. Part II. Classification: anæmias, hyperæmias, inflammations. Illustrated. Pp. 223 to 494. Philadelphia: J. B. Lippincott Co., 1898.

IN the day when systems and handbooks on special medical subjects are largely compiled by groups of skilled collaborators, one is ready to appreciate the courage and the patience, even the enthusiasm, of a single author, who sets himself to such a task as these pages both require and promise. Dr. Duhring is certainly entitled to great credit for the foresight and patience shown in the planning and in the pushing toward completion of his large scheme for a comprehensive treatise on cutaneous medicine. Author of a work the first edition of which was written more than twenty years ago on the same theme, a work not only then accepted as authoritative, but actually selling in the market for several years after it had ceased to be in touch with the requirements of modern medicine, its writer resisted the temptation to merely revise its pages and thus to bring it again before the medical public in merely a new dress.

He chose rather, with enormous labor and untiring energy, to write a new work sufficiently voluminous to enable one to find in its pages a fair summary of every subject of importance in dermatology, a volume prepared with such deliberation and care as to permit of a careful review of the literature of each theme.

The courage of our author is seen in his new classification, issued at a time when the subject of classification in cutaneous diseases is almost by common consent relegated to a future date, when the bacteriology of the several dermatoses shall be better understood. In the present instance most of the original classes of the old Hebra classification are retained, albeit in a different order from that in which they were at first set forth, and under these the disorders considered are arranged in such a manner that their clinical features as well as their normal and pathological anatomy receive consideration. The old class, however, in which were found the parasites, both vegetable and animal, affecting the skin, has been omitted, and the several disorders formerly thus collected are under the present arrangement to be found among the exuda-

tions, while a new class of anæmias, without the inclusion of special diseases, is placed at the head of the list.

Some odd results are thus reached. For example, it is difficult to understand how *tinca versicolor* is properly classed with the exudations, and comedo looks to be in strange company with the hypertrophies; but these are not the unusual, they are the common vagaries of classification. They are like the flies in the apothecary's ointment—they will be with us as long as we try to fit the facts of nature to our conventions. The classification thus devised is not without its advantages, however, and is not more defective than others which have preceded. It will probably serve a useful purpose in directing the studies of the beginner. The author probably neither expects nor desires its general acceptance.

Nearly one-half of the present Part is devoted to eczema alone, and the subject naturally receives the amplest consideration in all points of its manifold clinical features and therapy. The reader is furnished with detailed references to the work of the best modern investigators on almost every page. Evidence is not wanting that the author has modified to a degree the view he held when he first represented among Americans the teachings of the elder Hebra. For example, he writes: "In . . . cases the skin is in so debilitated a state . . . that restoration to health is not possible by local means alone. Constitutional remedies, if judiciously prescribed, will prove of benefit in many cases. Sometimes potassium iodide in small doses with an alkali may be prescribed with advantage, although the iodine preparations for the majority of cases are not beneficial," etc.

Under the title "Regional Forms of Eczema," Dr. Duhring has faithfully and fully presented the picture of every one of the many phases of this multiform disease as it is exhibited in every nook and corner of the body. In no treatise has this necessary work been done with more thoroughness and care. Large space is devoted to the diagnosis and special treatment of every variety of the disease in these several situations, and it would seem that even the wisest clinician could not fail to be instructed by a perusal of this chapter alone. In a field so carefully studied it is noticeable that the genital eczemas due to glycosuria, which were deemed by one writer in France to be of such importance as to justify their classification under the title of "diabétides," are here dismissed in a single sentence. It may be doubted whether in all these cases the glycosuria "is apt to produce eczema of the genitals," as our author puts it. It is possible that in the severe forms occasionally encountered, where there are enormous congestion and turgescence of the parts, especially in fleshy beer-drinkers, the eczema may be responsible at times for the transitory glycosuria.

In the out-patient department of the St. Louis Hospital, of Paris, the name of one American physician is to be heard certainly every week and sometimes daily on the lips of the professors and internes of that famous French charity. The name is that of the author of the treatise before us, and the title "*Maladie de Duhring*" is there as familiar as with us are the designations Jacksonian epilepsy and Bright's disease.

The disorder to which Duhring's name has been thus indissolubly wedded in France is with sufficient modesty described in the pages before us by the title under which it appears in the nomenclature of the American Dermatological Association, dermatitis herpetiformis. One

is not disappointed in finding here the fullest and best exposition of the subject which has yet been given. The disease is considered in its erythematous, vesicular, bullous, pustular, papular, and multiform expressions; and the text is illustrated with eight superb illustrative plates and three reproductions of the pathological appearances of the morbid skin in section.

The value and importance of the eosinophiles in this dermatosis are well shown in the cuts exhibiting the appearance of sections of the affected skin. Gilchrist's observations for the most part confirm the statements made by Leredde and Perrin, late interne of the St. Louis. Klein and Funk go even further than the gentlemen named, and declare that in this interesting disease, where both oligochromæmia and leucocytosis coexist, the eosinophiles constitute no less than 13 per cent. of the white corpuscles visible in the blood. Duhring gives few definite statements with relation to the prognosis of the malady. At times it is certainly a disorder to be greatly dreaded on account of its persistency and the suffering it entails. At others there is no question that recovery gradually ensues, and that of a highly satisfactory character.

The illustrations accompanying the text devoted to this malady are examples merely of the fulness with which the features of each disease considered have been reproduced in plates. The wealth of the latter is only equalled by their excellence. Of the cuts illustrating the pathology of the disease, it may be said, especially of those from the hand of Gilchrist, that they suggest in general diagrammatic drawing rather than the picture which the trained eye is accustomed to see through an objective.

Dr. Duhring's work is more than a valuable addition to the literature of eutaneous medicine. It is a permanently valuable thesaurus of the accumulated knowledge of these last two decades of enormous progress made in this special department of science. Every friend of the best achievements in American medicine will wish that our author may have the patience, the courage, and the strength to bring his work to a prosperous conclusion with its final page.

J. N. H.

TUBERCULOSIS OF THE GENITO-URINARY ORGANS, MALE AND FEMALE.

By N. SENN, M.D., Ph.D., LL.D., Professor of Practice of Surgery and Clinical Surgery, Rush Medical College; Attending Surgeon to Presbyterian Hospital; Surgeon-in-Chief, St. Joseph's Hospital, Chicago. Illustrated. Philadelphia: W. B. Saunders, 1897.

THIS book is divided into ten parts, appropriate space being given to a consideration of tuberculosis of all parts of both the male and female genital organs, and more lengthy special chapters on the bladder, ureters, and kidneys when attacked by this disease.

Each part opens with an excellent account of the conditions which predispose to tuberculosis of the particular part, or organ, in question, and, under the head of "Pathology," there next follows a very complete and intelligent description of the macroscopic and microscopic changes which occur in the tissues as a result.

For a book which is presumably intended for the instruction of the

general practitioner; it appears to the reviewer that scarcely sufficient stress is laid upon the subjects of symptomatology and of differential diagnosis; thus, the author, referring to a few of the more common and pronounced symptoms in the affection under consideration, generally at once instructs the reader to make the diagnosis by searching for tubercle bacilli, or he tells him that the true condition of affairs can be determined by a microscopic examination of the urinary sediments. That the presence of tubercle bacilli is of the very greatest diagnostic importance, probably no one at the present time would gainsay; but a careful comparison of the clinical phenomena observed in tubercular disease with those of the other affections of the genito-urinary organs could not fail to be of very great value. This is all the more true when it is remembered that a large body of our general practitioners are without the means, or the necessary technical knowledge, for making bacteriologic examinations. The author candidly admits that frequently the bacilli, even though their presence is beyond doubt, cannot be demonstrated by the ordinary methods, and in these instances very properly directs that the question be settled by injection experiments on animals; it suggests itself that the technic of this operation could have been added with advantage. The great liability of mistaking smegma bacilli for those of tuberculosis is not referred to until it is casually mentioned in the last chapter, when speaking of the urinary sediments in tubercular nephritis. This matter certainly deserves more than the passing notice given it, and especially should attention have been strongly directed to it when speaking of tuberculosis of the external genitals. In the light of our present knowledge the statement made on page 270—and in substance reiterated on pages 199 and 271—that “the morphology of the epithelial cells contained in the urine will indicate the location of the tubercular lesion,” cannot be substantiated. At any rate, but little importance is attached to the morphology of the epithelial cells found in urine by the great majority of the authorities on the subject at the present time—with a constant tendency to assign less and less weight to it as a diagnostic sign; and if trained observers confess their inability to differentiate these cells from each other by microscopic examination, it is surely too much to expect it of those not skilled in such methods of research.

In speaking of treatment the author, on the whole, is somewhat disposed to be optimistic. In this connection the reviewer does not feel called upon to express an opinion, as our views on this subject are so largely a matter of temperament and of habit.

There are twenty-six cuts, some of which are very good.

A perusal of this work does not, perhaps, convince one of the absolute necessity for its existence; but however much we may doubt this necessity, it cannot be denied that Dr. Senn's book has been written with a great deal of care, and that, in the main, the subject has been dealt with in a thoroughly accurate and comprehensive manner. At the very least, it should serve to direct attention to these rather unusual manifestations of tuberculosis, and to this extent should be productive of good. The book is almost entirely free of typographical errors, and the publisher's work is well done.

H. F. H.

THERAPEUTICS: ITS PRINCIPLES AND PRACTICE. By H. C. WOOD, M.D., LL.D., Professor of Materia Medica and Therapeutics, and Clinical Professor of Diseases of the Nervous System, in the University of Pennsylvania. Tenth edition. Pp. xxxi. 1033. Philadelphia: J. B. Lippincott Co., 1897.

THE author describes his book as a work on medical agencies, drugs, and poisons, with especial reference to the relations between physiology and clinical medicine, and he believes that it "fully represents the therapeutic science of to-day." As we read the preface to the first edition, written more than twenty years ago, we can hardly realize that so vigorous an argument for physiological therapeutics was ever necessary. Yet when we consider that empirical therapeutics then held sway, we appreciate the necessity of a forcible plea for recognition and the importance of the new departure in American therapeutic literature. The author has lived to reap the reward to which his courage, faithful study, and patient experimentation have entitled him, and to know that this edition is recognized as an able exponent of scientific therapeutics. The new edition differs from the last in the addition of about twenty-five pages and a fuller table of contents to which the pages, upon which various subjects are to be found, are inserted. Much of the new matter is to be found under the head of nucleins and animal drugs (pp. 624 to 638), and there are new paragraphs placed interstitially in the text. New sections are those upon anarcotine, eucaine, and formaldehyde. Phosphorus, instead of ending the chapter on tonics, now commences that on alteratives—a very proper change. In presenting the subjects of atropine and arsenic the author acknowledges his indebtedness to others. Of the new in this edition our chief interest lies in what is said concerning animal drugs, and we agree with the statement that "there is no scientific reason, nor yet any good clinical observation, to show that most of these substances act therapeutically in any other way than by making a psychical impression." Of substances derived from the thyroid gland, supra-renal capsules, and spleen, it can be said that their value has been proved. Of the antitoxins the results are satisfactory in tetanus and diphtheria; to a less extent in erysipelas and snake-poisoning. In noting the importance of the early administration of antitoxin in diphtheria the author very properly remarks that "modern municipal scientific methods, notwithstanding all their laudations, are liable to become causes of death" through the delays which they entail. It can also be very properly remarked that through gross carelessness and ignorance the results obtained from Board of Health examinations are often far from being trustworthy. There is so much to commend in this work that we feel considerable reluctance in calling attention to details of minor importance, but which detract from its value. We would suggest that a reading of narcotine (p. 183) and of anarcotine (p. 186) would indicate a confusion in the mind of the author which a reference to this JOURNAL (1895, vol. ex. p. 593, abstract of article by Roberts) would clear up. We consider, in view of the serious symptoms produced by smaller amounts, that the dose of chloralose (five to ten grains) is too large (p. 205). We doubt if quinine is so powerful a stimulant to the uterine contractions during labor as is stated on page 652; at least a recent collective investigation tends toward the belief that it is not more valuable than other stimulants, as alcohol, under similar conditions. Although there is no doubt

that chlorine water is capable of producing a toxic gastro-enteritis (p. 995), in our opinion its irritant properties so far as concern the mucous membrane of the alimentary tract are greatly exaggerated. Strontium bromide would have been more properly presented with the bromides than with the strontium compounds. But rarely do we find the small errors into which authors of works upon therapeutics fall. We note: arsenious acid (p. 935), fluid extract of *zea mays* (p. 840), of which there is none official, although the *Pharmacopœia* calls for one, and tubercular laryngitis, tuberculous diarrhœa (p. xxx). We are pleased to find that the author has not been led astray by the very ingenious theories of Bunge in regard to iron.

We place this edition beside its predecessors, convenient for study, in the opinion that the belief of the author as quoted in the first sentence of this review is warranted, although we miss in the reading of this book references to many reports which have come from the physiological laboratories in recent years, and with some of which the readers of this *JOURNAL* are familiar. It may be that time will more accurately determine their value, and that opinion should be withheld. We would regard the acquisition by the student of the facts set forth in this volume as essential to a thorough knowledge of the application of the *materia medica* to the disease which is to be treated. Judging from the knowledge exhibited by the average recent graduate we are expecting too much from the schools. We can keep our ideal before us, and, without being discouraged by the number of those who have failed in their attempt to master this work, still believe that this represents a remarkably successful effort to present therapeutics from the physiological standpoint.

R. W. W.

APPENDICITIS AND ITS SURGICAL TREATMENT. By HERMAN MYNTER, M.D., Professor of Operative and Clinical Surgery in Niagara University, Buffalo. 8vo. pp. 303. Philadelphia: J. B. Lippincott Co., 1897.

THIS volume is a valuable contribution, and will appeal to those who study scientific subjects in a calm, deliberate, and logical manner. It is free both from wild and inaccurate assertions, which do not convince the thoughtful, and from the persistent conservatism which fails to acknowledge the necessity of progress in medical science.

The author has evidently made an extensive study of the literature of appendicitis, and has consequently given an epitome of great usefulness. The opinions of other writers are frequently quoted; and his own personal views, founded on considerable experience, are stated in a modest, practical, and judicious manner. He shows his appreciation of the fact that a scientific author must write in a manner that carries conviction by its evident judiciousness rather than by the violence of the language.

The section on diagnosis is full and valuable. He believes that there are certain symptoms which may be called cardinal, but states that every one of these may be lacking or indicate some other condition. It is their combination and their appearance in a distinct order that make the diagnosis sure. He considers the pulse more important as a diagnostic guide than the temperature in settling the propriety of operation

and determining the presence of diffuse septic peritonitis. The colon bacillus is, in his opinion, the most important etiological factor in the production of appendicitis.

Dr. Mynter believes in the operative treatment of the condition under discussion, and has operated on every case he has treated as soon as the diagnosis was clear (p. 153); and yet, in discussing the supposed rheumatic origin of some cases, he states that many early cases recover by rest and appropriate treatment alone (p. 134). He is probably correct in attributing the discordant views of physicians and surgeons to the fact that physicians see cases which recover, and therefore look upon appendicitis as being on the whole a rather benign disease, while surgeons see the severe and fatal cases, and therefore consider the affection as one of high mortality if not treated surgically. He uses opium in sufficient doses to make the patient comfortable and prevent peristaltic action, as soon as the diagnosis is made, until operation can be arranged for and performed; but objects to the use of opium as a method of medical treatment. He considers the use of cathartics in acute cases decidedly dangerous; but employs them, however, soon after the operation has been performed, preferring calomel and sodium bicarbonate, followed by salines.

His opinions may, perhaps, be summed up in the following statements: Every acute case with severe pain, vomiting, rigidity, and rising temperature and pulse, which shows no inclination to improve in twenty-four hours, is a proper case for operation. If the pulse increases in frequency and remains at 115 or over, immediate operation should be done. If the symptoms commence to abate after twenty-four hours from the onset of the disease, it is proper to wait for the quiescent period. Removal of the appendix in the quiescent period should be done after a first attack of inflammation, if the symptoms were severe; after the second attack, if the symptoms were not severe, and if tenderness and swelling of the appendix be present. He does not consider operation indicated in the quiescent period, unless palpation satisfies the surgeon that the appendix is in a pathological condition. In cases where a large abscess is present he believes it best to simply incise the abscess and drain it without removing the appendix, unless its removal is readily accomplished without risk of infecting the general peritoneum.

J. B. R.

TWELFTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH AND
VITAL STATISTICS OF THE COMMONWEALTH OF PENNSYLVANIA, 1896.
2 vols. CLARENCE M. BUSCH, State Printer of Pennsylvania, 1897.

CONSIDERING the meagre sum which the great and wealthy State of Pennsylvania appropriates for this most important branch of the public service, the State Board of Health presents a very creditable annual report. Vol. I. contains the report of the Secretary, the minutes of the meetings of the Board, and a number of appendices treating of various subjects; Vol. II. consists wholly of appendices dealing largely with papers and proceedings of various sanitary organizations, besides statistics, etc., of hardly more than local interest.

From the report of the Secretary it appears that blindness is increasing in the State over five times as rapidly as the population, the greater part of the increase being due to purulent ophthalmia of the newborn. This alarming fact has led to the enactment of an act requiring notification, and consequent immediate treatment, within six hours of the discovery of the first symptoms of the disease.

Owing to the very general vaccination in 1894, and the enforcement of the law for vaccination of school children, passed in 1895, smallpox has appeared in only five places, against eight and forty-one, respectively, in the two years immediately preceding. On the other hand, scarlet fever and diphtheria have steadily increased, particularly in the rural districts. The Board was called in in forty outbreaks of the former disease, or in nearly twice as many as in the year previous. Typhoid fever is also very prevalent, and the deaths from that disease alone amounted, in Philadelphia, to 40 per 100,000 of population. The great prevalence of this disease is ascribed to polluted water.

That such a lamentable condition of the public health as is shown in this report should exist is not surprising when one considers that in this great Commonwealth about three millions of people live beyond the jurisdiction of any local sanitary authority; that with all the wealth of appropriations, the amount grudgingly given for the oversight of the public health amounts to about a dollar for every 1500 of population (a total appropriation about one-twelfth as large as that for the State Board of Health of Massachusetts); that there is no suitable system of registration of vital statistics, and that the public waters are not protected against needless contamination.

Among the reports of inspections are several worthy of especial mention. Those on the purification of sewage at Reading, with nine double-page illustrations of the various parts of the plant, and on the inspection of the sources of contamination of the Schuylkill River are among them. The former may well be a source of pride to Reading; the latter should bring the blush of shame to Philadelphia, with her 40 deaths from typhoid in every 100,000 of population.

A striking example of the value of proper treatment of polluted water is cited—the experience of Girard College, where typhoid had been almost constantly present, and where the drinking-water used had been pumped directly from the river. A filtering-plant was established, and the fever began to diminish, and soon disappeared, while it continued as before among the immediately adjoining population, which still continued using the unfiltered water of the Schuylkill.

The reports of the examination of the vaccine farms, and the methods of operating the same, are very complete and instructive. Examination showed that three of the four plants in the State were not conducted with even ordinary cleanliness.

The report, taken as a whole, indicates that the State is fortunate in its Board, if not in its indifference to its health; and that the one could improve the other had it only the opportunity, which means a decent appropriation.

C. H.

PROGRESS OF MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF
REYNOLD W. WILCOX, M.D., LL.D.,
PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL
SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

Orthoform.—DRS. A. EINHARN and R. HEINZ state that a local anæsthetic which shall relieve the pain caused by wounds, ulcers, burns, rhagades, and excoriations must possess two characteristics: (1) absolute harmlessness; (2) difficult—*i. e.*, slow—absorbability. After considerable experimentation it is believed that these indications will be fulfilled by p. amido—m. oxybenzoic acid—methylester, which has been named as above. This occurs as a white, somewhat voluminous powder, without odor or taste, slightly and slowly soluble in water. With chlorides it forms crystals which are readily soluble in water, giving an acid reaction, and possess the anæsthetic properties of the free ester. Because of their acid reaction, their solutions are not to be used upon sensitive mucous membranes, especially upon that of the eye, or in tissues of alkaline reaction which are sensitive to acids. Therefore they cannot be used subcutaneously. The anæsthetic action of the drug is easily recognized upon mucous membranes, as when placed upon the tongue, after a few moments numbness is experienced, and later the place becomes analgesic. For complete anæsthesia the drug is employed as a fine powder; for wounds and ulcers an ointment is recommended. Various instances of its use are cited: wounds resulting from skin-transplantation, as 10 per cent. ointment; burns of the first and third degree; painful ulcerations, facial carcinoma, as powder. In such instances a distinctly antiseptic action is noted; it decidedly limits suppuration both by checking secretion and by being inimical to bacteria. This is well shown in ulcers of the feet and legs. In injuries, contused wounds, fissures in lips, nipples, or fundament, excoriations in tongue or lips, it is useful. It is a valuable remedy for the relief of laryngeal ulcerations in that an application will relieve pain for twenty-four hours, so that food can be readily taken. In gastric ulcer or cancer, in distress due to gastric catarrh or dilatation, good results should be expected, and here the soluble salts should be chosen. In genito-urinary diseases the

soluble preparations in 10 per cent. solution have given good results. One injection in a patient suffering from chronic gonorrhœa relieved his pain for twelve hours. An acute gonorrhœa, after four days, showed no gonococci, and the discharge stopped, although severe irritation followed each injection. On this account it may be well to employ emulsions, bougies, or insufflations of the free drug. Since it is absolutely non-poisonous, seven to fifteen grains can be given internally several times daily.—*Münchener Medicinische Wochenschrift*, 1897, No. 34 S. 931.

The Treatment of Membranous Enteritis.—DR. ALBERT MATHIEU presents the following as the fundamental principles of treatment: 1. The disease cannot be cured without relieving the constipation. 2. With this disease there is an irritation of the large intestine, which shows itself sometimes by a mucous hypersecretion and at others by hyperæsthesia and spasmodic contractions of certain zones of the colon. 3. The disease attacks by preference persons predisposed—neuro-arthritics or neurotics—and exaggerates these conditions. 4. It occurs more frequently in persons suffering from nephrop-tosis, enteroptosis, or from uterine or periuterine lesions. Taking up the individual conditions, in the first place the alimentary tract must be spared useless or severe irritation, so that drastic purgatives are proscribed. Aloes, which congests the rectal mucous membrane, should not be administered. Should the congestion of the alimentary tract become so marked that bloody stools result, hydragric or hamamelis may be given. Massage is frequently badly borne, on account of the hyperæsthesia of the large intestine; but it may be useful to improve the tonicity of the abdominal muscles and those of the intestinal wall. The same may be said of Swedish gymnastics. For laxatives castor oil in gelatin capsules, or, better, in dose of one-half to one teaspoonful in black currant syrup, diluted with water, should be given ten minutes before breakfast, on alternate days, with large injections. Rhamnus purshiana, with magnesia and double the quantity of sodium bicarbonate, come second in esteem. If there is diarrhœa dependent upon constipation, ten to twenty days' use of saline purgatives or mineral water, as Rubinat or Carabaña, will prove beneficial. Great reliance is placed upon large injections, which remove the masses, reduce irritation of sensory, motor, and secretory functions of the large intestine, and, moreover, act as mechanical antiseptics. The fountain syringe, with reservoir raised one or two feet, the patient lying upon a bed with the left hip raised, boiled water at a temperature of 104° F., to which a decoction of marshmallow is added, the whole amount reaching one and one-half to two quarts, are the details of administration. If much mucus or membranes are present, then a drachm of sodium biborate or fifteen grains of sodium salicylate should be added. Injections of hot water are excellent for calming the intestinal pain. Besides, hot applications (large compresses wrung out of hot water) should be applied for twenty to thirty minutes each morning over the abdomen, or cold applications, which are equally soothing, may be substituted, and these act favorably upon the constipation. For severe pain or painful crises a pill of one-sixth of a grain of extract of belladonna will usually suffice, and this benefits the constipation. The general condition demands attention; as sedatives, ammonium valerianate is efficacious and out-door life is important. The regimen should forbid

all irritating foods and condiments; not only those which by their decomposition and putrefaction irritate, but as well those which present objections from the mechanical stand-point. With care the diet can be so regulated that an insistence upon a strictly milk-diet may be avoided. It may be necessary to make a temporary use of milk and alkaline purgatives. In case of great emaciation a diet of raw meat may be advantageous.—*Revue de Thérapeutique*, 1897, No. 14, p. 468.

M. DIGNOT has found, from observations upon twelve patients, that injections of artificial serum in amount from four to six drachms produce, in about three weeks, a total disappearance of pain and of the false membranes. One has remained cured for six months. In three others there was a rapid disappearance of glairy stools and false membranes. The success of this indirect treatment, intended to remedy the general health of the patients, always either neurasthenie or neuropathie, clearly shows that the disease is dependent upon the general health.—*Revue de Thérapeutique*, 1897, No. 21, p. 732.

Nervous Vomiting.—DR. ALFRED MEISL reviews the diagnostic points, summing up the therapy as follows: 1. For the general neurosis, change in surroundings, country air, sojourn in an institution, rest, hydrotherapy, and general faradization. 2. Diet of solids administered in small quantities. If intolerance is severe, then rectal enemata for a few days. The stomach-tube also may be used, and milk to three ounces inserted several times daily. In mild cases one-sixth of a grain of menthol with a grain and a half of sodium bicarbonate after meals, or suppositories of one-third of a grain of extract of belladonna and half a grain of codeine are useful. If there is hysterical hypersecretion, bismuth preparations with alkalies in large doses are useful. Cold applications, as ice-bag or ether spray, may assist the action of the drugs. Suggestion is to be made use of, either as to the effect of drugs, or that food which is introduced through the stomach-tube cannot be vomited, or a fast for twenty-four hours may be ordered, and then liquids in teaspoonful doses at short intervals given. After cessation of the vomiting roborant medication, iron and arsenic, best as arsenical mineral waters, and strengthening feeding are necessary to prevent relapse.—*Centralblatt für die Gesamte Therapie*, 1897, viii. Heft, S. 449.

Tannalbin.—DR. WILLIAM HENRY PORTER states that this drug appears to be nothing more than a highly dehydrated tannin albuminate. In the stomach its free administration will often arrest the superabundant outpouring of mucus. It generally augments the digestive powers, not directly, but by removing some of the factors which are causing the indigestion. It also precipitates the mucus, thus destroying one of the favorable media for the growth of the micro-organisms. In this manner it very decidedly aids in overcoming the so-called super-acidity of the contents of the stomach. In the acute diarrhoeal affections of children, and particularly in those instances in which there is a large outpouring of mucus, this drug has proved very efficient. In the chronic affections it is the most serviceable, but strict attention to diet and the use of artificial aids to digestion must not be omitted, such as hydrochloric acid after meals, inspissated bile and the pancreatic

extracts before meals. To this may be added the malt extracts, such as maltzyme, which seems to have the more active diastatic action.—*The Post-Graduate*, 1897, No. 11, p. 647.

The Action of the Opium Alkaloids upon Peristalsis.—DR. ZOITÁU V. VÁMOSSY, after a careful review of the literature bearing upon the cause of the greater inhibition of peristalsis by opium than by morphine, fails to find with rabbits any notable difference of power between the two substances. After the slight hyperæmia caused by the alcohol (tincture of opium) has disappeared, the intestine remains as quiet as with morphine. Further narcotine only slightly diminishes the reflex excitability of the intestinal wall, and does not possess any inhibitory action so far as peristalsis is concerned. Papaverine resembles morphine so far as this property is concerned, but is not of therapeutic use, because of its uncertain action. Theabaine increases intestinal excitability, and even gives rise to intense peristalsis. Narceine resembles the narcotine. Codeine increases intestinal excitability. Cryptopine and landanime act as does codeine. So far as this investigation has gone the question is unanswered. This much is evident: Opium does not possess a favorable influence upon the intestine by virtue of the accessory alkaloids which it may contain. It is of the highest importance, however, to establish the fact that physiological experiments have demonstrated that the influence of morphine on peristalsis is due to a local action.—*Revue de Thérapeutique*, 1897, No. 16, p. 511.

Argentamine.—DR. J. S. SCHULHOF reports upon the use of this substance, which is æthylendiamin silver phosphate. This penetrates much more deeply into the tissues than the nitrate; it is equally astringent in weaker solutions; it is a much stronger disinfectant than corresponding solutions; it is a much better bactericide for gonococci; it possesses a higher germ-destroying power for various micro-organisms. He reports 328 instances of its use in catarrhal conjunctivitis, trachoma, catarrhal ophthalmia, ophthalmic blennorrhœa, follicular catarrh, traumatic conjunctivitis, blennorrhœa neonatorum, and eczematous conjunctivitis. The remedy is used in 5 per cent. aqueous solution once or twice daily, instilled without after-irrigation with water or sodium chloride solution. Corneal complications, even ulceration, pannus, iritis, or cyclitis, are not contraindications. It should be preserved in dark glass bottles.—*Wiener Medizinische Wochenschrift*, 1897, No. 33, S. 1525.

Cocaine and Suprarenal Extract as Local Anæsthetics.—DR. W. H. BATES notes that in 10 per cent. solutions, cocaine is a cause of pain, owing to the exfoliation of corneal epithelium, to which it gives rise during long operations. The use of a speculum is also objectionable. This drug, in 2 to 4 per cent. solution, should be instilled every few minutes, until anæsthesia is produced, and the eye should be closed frequently. There are cases which require one-half hour or more to produce anæsthesia. If the eye is sore or inflamed, cocaine is inefficient. Here a few drops of a solution of extract of the suprarenal capsule will sufficiently relieve the congestion so that cocaine will produce anæsthesia. By this combination ether in advancement opera-

tions can be dispensed with, and iridectomies and inflammatory glaucoma operations become painless. More than one hundred operations performed during the past three years demonstrate the utility of the method. The suprarenal extract is prepared immediately before the operation by mixing about ten grains of the dried powdered glands in half a drachm of water and filtering, which results in an unirritating and non-poisonous solution. No antiseptic should be added. To prevent subsequent soreness, a fountain syringe holding a quart should be filled with water of a temperature of 115° F., to which two drachms of sodium chloride have been added, placed at an elevation of three feet, and the eye thoroughly douched, the water draining into a basin placed beneath the eye. This procedure should be repeated three times.—*New York Medical Journal*, 1897, No. 985, p. 529.

The Opium-Bromide Treatment of Epilepsy.—DR. WARDA describes Flechsig's method as follows: Opium is administered for six weeks in gradually increasing doses until the daily amount of fifteen or more grains is reached. The opium is now withdrawn, and the bromides in large doses substituted. His personal use of the bromides is described as commencing with the daily dose of ninety to one hundred and thirty grains, to continue this for three or six months, then, by reductions each six months, to come to fifteen to thirty grains daily after two or three years. Rest in bed, intestinal irrigation, and attention to diet aid this treatment. The history of forty-four patients, including eleven of Bennecke, is given, with the result that 27.5 per cent. were decidedly, the same percentage slightly, improved, 42.5 per cent. unchanged, and one became worse (fatal result). Since, according to this study, 55 per cent. were improved, the method may be understood as a real advance in the treatment of epilepsy.—*Monatschrift für Psychiatrie und Neurologie*, 1897, Heft 4, S. 257.

The Treatment of Diabetes Mellitus by Uranium Nitrate.—DR. EBENEZER DUNCAN reports four instances of the use of this drug, and believes that the diminution of the urine and of the sugar in these cases and the improvement in the weight and in the general health and strength of these patients are due to the stimulating effect produced by the uranium salt on the sugar-consuming cells of the human body. This effect may be either direct or indirect through the trophic nerve centres. The sugar formed from the food of the patient is no longer excreted, and as the patient gains in weight and muscular strength it must have been consumed in adding to the nutrition of the tissues. It is true that by physiological experiments it has been proved that outside of the human body the uranium salt retards the digestion of starch, and forms an insoluble compound with albumin, and on that ground it was thought to be likely that in diabetes its action is due to the effect it has in checking the rapid digestion of starch and some forms of albumin. The difficulties in accepting that theory are, first, that patients appear to digest their food quite normally, and even rapidly, as shown by the frequent meals for which they asked; and, in the second place, the large amount of sugar of milk taken in these cases would ultimately have overflowed into the urine if it had not been taken up by the sugar-consuming cells. It is likely that this remedy will prove to be most useful in cases of neurogenous origin, and

therefore it may form a useful test in the differential diagnosis between neurogenous and pancreatic and other forms of diabetes. In the latter class of cases it will not probably be of any value. The statement has been made that the drug is a dangerous irritant poison, producing gastro-intestinal irritation and nephritis. No injurious effect was observed in these patients, who received from five to twenty grains taken thrice daily for several weeks.—*British Medical Journal*, 1897, No. 1920, p. 1044.

Urotropin.—DR. J. COHN presents the result of his use of this drug, which is hexamethylentetramin, produced by the action of formaldehyde upon ammonia. In cystitis following prostatic hypertrophy or of unknown origin he finds seven-grain doses twice daily to rapidly clear the urine of micro-organisms. In the cystitis of gonorrhœa or tuberculosis the results were not satisfactory.—*Berliner klinische Wochenschrift*, 1897, No. 42, S. 914.

Euphthalmin: a New Mydriatic.—DR. D. B. TREUTLER states that this drug bears the same relation to eucaine as homatropine to tropacocaine. On instillation the after-disturbances are slight and of short duration. It enlarges the pupil to the maximum when used in a 5 or 10 per cent. solution in about one-half of the time required for a 1 per cent. solution of homatropine. In the old it is not so powerful, and acts more slowly than in young individuals. It has the advantage over cocaine of less violent action and of not producing any injury to the corneal epithelium, but the disadvantage of slower action. The accommodation is less disturbed than by homatropine. The mydriasis and paralysis of accommodation pass away more rapidly than with the last-named drug.—*Klinische Monatsblätter für Augenheilkunde*, 1897, Heft 9, S. 963.

The Treatment of Typhoid Fever by Pyramidon.—DR. ARNOLD BRANDEIS reports the results of the use of this drug, which is dimethylamidophenyl-dimethylpyrazolon, in eight instances. It is apparently a very much slower and milder antipyretic than antipyrine, although its effects last longer. Unpleasant symptoms, as profuse perspiration, weak pulse, and even collapse, have been noted after use of one and one-half to three and one-half grains twice daily.—*Prager Medicinische Wochenschrift*, 1897, No. 44, S. 525.

The Natural and Artificial Essence of Wintergreen in the Treatment of Rheumatism.—M. VIDAL noticed, on substitution of compresses wet in essence of wintergreen for internal administration of sodium salicylate for patients whose digestive tracts and nervous systems it was necessary to spare, that in a certain percentage various skin eruptions, ranging from simple erythema to recurring papular eczema, appeared. The drug was used in fifty to one hundred drops upon a double layer of aseptic gauze and covered with an impermeable dressing. On investigation he found that the natural and artificial essences were sold indifferently in the shops. The former contains various hydrocarbons and 90 per cent. of methyl salicylate. The latter is pure methyl salicylate made synthetically. Applications of each made upon the same individual showed that the latter did not produce any cutaneous disturbance. It is probable that the eruptions caused by the former

can be explained as due to the undetermined resins (gaultherilene) contained in it.—*Les Nouveaux Remèdes*, 1897, No. 20, p. 615.

Serum-therapy in Diphtheria.—DR. BERLIN reports the outcome of the treatment of five hundred and twenty-nine children. Of these fifty-six died (10.6 per cent.). The paper shows that on the whole the mortality has been considerably lowered, but not so much as was formerly hoped for. The serum cannot be held responsible for severe untoward symptoms, nor with surety can deaths be charged to it alone. Yet it cannot be denied that it does act upon the kidneys. Post-diphtheritic paralysis and relapses are without doubt more frequent.—*Münchener Medicinische Wochenschrift*, 1897, No. 42, S. 1159.

The Medical Treatment of Toothache.—DR. FREDERIC C. COLEY believes that few toothaches are incapable of permanent relief without extraction of the tooth. A single dose of two grains of exalgin may relieve a raging toothache. If the pain comes on after taking food, when the contents of the stomach are naturally acid, a Seidlitz powder minus about one-quarter of the acid may relieve with astonishing rapidity. When the pain is started by "taking cold," even when what is called periostitis by the dentist is present, where the carious tooth becomes slightly loosened, projecting beyond its neighbors, and is exquisitely tender when eating is attempted, fifteen grains of sodium salicylate, repeated in four hours, will usually promptly relieve the pain. If fifteen minims of tincture of belladonna are added, refreshing sleep may be obtained. In other cases phenacetin may succeed if this treatment has failed.—*The Practitioner*, 1897, No. 351, p. 259.

The Treatment of Pneumonia with Large Doses of Digitalis.—DR. RUBEL, in commenting upon the mortality (2.6 per cent. in 1192 cases), states that in the young, robust men in a military hospital the mortality is always low (3.65 per cent. in the German army). Petrescu claims that with this method the disease is stopped in three days, and one of his pupils that the temperature falls after three days of treatment. The author reports that apyrexia is established in from seven to ten days, and that convalescence is not shortened. Instances of poisoning by this method are not unknown.—*Therapeutische Wochenschrift*, 1897, No. 39, S. 998.

Iron-Somatose.—DR. E. ROOS reports upon this substance, which is a brown powder readily soluble in water and containing 2 per cent. of iron in organic combination, the dose being about seventy-five grains *pro die*. Four instances of its use are cited, recording the increase in body-weight and percentage of hæmoglobin.—*Therapeutische Monatshfte*, 1897, Heft 9, S. 488.

The Treatment of Tuberculosis with Cinnamic Acid.—DR. TH. HEUSER finds that leucocytosis follows the subcutaneous and intramuscular injections of this substance. Later it is expected that an aseptic inflammation will wall in the tuberculous area and encapsulate it, with subsequent contraction and formation of cicatricial tissue. During the past three years he has treated twenty-two patients, with the result that six were cured, twelve improved, three without benefit, and one had died. The injections are made

into the gluteal muscles under all aseptic precautions. The dose is one and one-half minims of a 5 per cent. emulsion, which is increased by this amount until the maximum dose of fifteen minims is reached. In general, the treatment should last six months. It is claimed that this is an important remedy, the gluteal hypodermatic injections are harmless, it can cure a considerable proportion of patients suffering from pulmonary tuberculosis, but it is not a specific.—*Therapeutische Monatshefte*, 1897, Heft 9, S. 451.

Stypticin in Uterine Hemorrhage.—DR. MAX NASSUER reports in detail forty-nine instances of the use of this remedy, which is cotarnine hydrochlorate. In three instances of hemorrhage at the climacteric the results were ideal. In twelve of hemorrhage after abortion and in two after parturition the remedy was hæmostatic in a short time. In hemorrhage reappearing after curettage the results were satisfactory. In reflex or secondary hemorrhage, with diseased adnexa and uterus probably normal, the effects were excellent. For myomatous uteri the remedy seems to be efficient. In threatened abortion, in spite of the adverse report of Gottschalk, the remedy should be used not only to check the hemorrhage, but also to obtain the sedative effect which it produces similar to that of opium. The dose is one-third of a grain in a 10 per cent. aqueous solution, injected deeply into the muscles. By the mouth it may be given in grain doses four times daily.—*Therapeutische Wochenschrift*, 1897, No. 32, S. 793; No. 33, S. 827.

The Administration of Safe Anæsthetics.—MR. H. BELLAMY GARDNER writes so pointedly in regard to this subject that we quote the following: "Under the heading of 'The Safe Administration of Anæsthetics' several communications have appeared lately, chiefly devoted to the worship of weird and manifold remedies (always a sign of their futility) for the difficulties and dangers of chloroform administration. I would beg to humbly suggest that if this title were transposed and our attention, and more especially the teaching in the schools, were directed to the administration of safe anæsthetics, we should have less of the terrible mortality from chloroform which week by week is reported in the medical press of the present day. From the most carefully collected statistics we know that the mortality from chloroform in England and the Continent is very nearly 1 in 2300 administrations, that of the alcohol-chloroform-ether-mixture is 1 in 5000 cases, that of ether 1 in 13,500 inhalations, while nitrous oxide gas has a scarcely appreciable mortality, and yet practitioners in Ireland and the English provinces keep writing about chloroform as if they had never heard of ether at all. Junker's methylene and chloroform inhaler, which has been used for a score of years, was actually figured during last month as if it were a heaven-sent gift and panacea for all perturbed anæsthetists. The fact is, that several deaths have occurred in connection with its employment. It is not by 'methods' with chloroform, but by learning how to give ether and nitrous oxide gas properly that the number of these lamentable deaths under chloroform can be reduced. Those of our London anæsthetists who have a lifetime of experience rely almost exclusively upon ether and gas and ether for the whole of their routine work, only giving chloroform when ether becomes inadmissible. We must, indeed, be blind and prejudiced if, to save

taking a little trouble, we go on giving chloroform to the most trivial cases requiring anæsthesia, knowing all the time that the drug is so difficult to eliminate when grave symptoms appear that we dare hardly expect to save the patient whose respiration ceases under its influence. The extreme rarity of a death from ether, and its stimulant effect upon the whole system, obvious even to a layman, is daily being more appreciated by the public, who are, after all, the best judges. They care little for the 'schools' of this and that drug; but they very rightly do not want to risk their lives for no justifiable reason, and we ought not to tempt them to do so."—*British Medical Journal*, 1897, No. 1907, p. 160.

MEDICINE.

UNDER THE CHARGE OF

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On the Theory of Addison's Disease.—MOSSE (*Fortschritte der Medicin*, 1897, No. 21) has examined the toxicity of certain organs in a typical case of Addison's disease, with atrophy and calcification of the adrenal bodies. Extracts of the adrenals, liver, and spleen were made, according to the method of Blumenthal, with physiological salt-solution saturated with chloroform and containing 0.05 per cent. of sodium carbonate. Experiments with various amounts of the extract so prepared showed that those of the spleen and adrenal, that of the liver to a less extent, were all poisonous to white mice. Control experiments with extracts of the organs of a patient dying of nephritis showed an entire absence of symptoms.

The conclusion is that the organs in Addison's disease contain a poison, and in the spleen it would seem that the poison is carried to this organ by the blood. The author draws the further conclusion that the adrenals have two functions—one the production of a physiological substance of a stimulating character, the other the neutralization of poisons formed in various parts of the body. In Addison's disease both functions are impaired.

On the Relation of Gastric Disorders to Nasal Disease.—DR. TREITEL (*Archiv für Verdauungs-Krankheiten*, Band iii. Heft 3) calls attention to this relationship, which has been curiously neglected. This neglect is all the more remarkable when we remember that gastric and pharyngeal diseases have long been recognized as frequently correlated, and recall the frequency with which pharyngeal disease has a nasal origin. French has shown how obstructive disease of the nose could set up stomach disease, by leading to in-

complete mastication. Treitel calls attention to the influence of crusts of dried nasal secretion in the pharynx. The hawking and straining due to these often cause vomiting and irritation of the stomach. Not less harmful are the chemical decompositions caused by nasal secretions; while in some persons the odor of the secretions causes loss of appetite. A number of cases are cited in which the relations of nasal disease to symptoms on the part of the stomach were observed.

In one case of ethmoid abscess the dyspeptic symptoms were probably due rather to the intense headache than to other results of the local disease. In all the cases the removal of the nasal disease was followed by improvement of the stomach. A few cases are cited from the literature. The influence of the gastric disease on the nasal mucous membrane is alluded to.

Tuberculosis of the Appendix Vermiformis.—SCHUMHARDT (*Berliner klin. Wochenschrift*, 1897, No. 41) reports a case of this kind in a man, aged twenty-two years, then serving his year in the army. In September, 1896, he was taken with pain in the ileo-cæcal region. Later a hard tumor appeared, reaching the size of an apple. Fever developed; the tumor showed fluctuation. An operation for appendicitis failed to reveal the appendix, but opened a cavity the size of a walnut, lined with tuberculous granulations. The wound healed partially, leaving a small fistula. Five months later a second operation was performed. The appendix was found adherent to the small intestine, into which it had perforated. The mucous membrane at the site of the adhesion was tuberculous. A wedge-shaped piece of the intestine was removed with the appendix. The patient was discharged in five weeks with a small granulating wound.

Gastrodiaphany.—OPPLER (*Archiv für Verdauungs-Krankheiten*, Band iii. p. 334) gives a very useful review of the literature of this subject, with references to thirty-five original articles. Of the conclusions drawn by the author, the following are most important: The instruments of Kuttner and Jacobson and of Meltzing are to be preferred. The light should not be stronger than four candles. The transillumination must take place in a room entirely dark. The stomach must be clean, the intestines as empty as possible of contents (and gas), and the bladder empty. The illumination should be made both in the horizontal and standing positions. With the empty stomach there is often no connected picture, but only a series of roundish bright spots, and in the horizontal position, on account of the sinking of the lamp, there may be no illumination at all. If the lamp is allowed to glide along the greater curvature the centres of the bright spots produced approximate the position of the curvature. In the case of a thick abdominal wall the results are erroneous, as they are in all cases when strong light is necessary. The thinner the abdominal wall the more exact are the results, though the boundaries may seem lower. It seems, therefore, that the lower boundary (greater curvature) is lower in some cases than has been supposed, but not so much so as some claim, and not in all cases. The so-called megalogastria in persons with thick abdominal walls depends on an error. By the illumination with from 500 to 1500 c.cm. of water in the stomach a bright spot is produced, the right upper boundary of which is made by the right and left lobes of the liver,

the left upper boundary by the spleen. These boundaries are more exact than can be made by any other method. The lower boundary is from 4 to 11 cm. lower in the upright than in the horizontal position, and on the whole somewhat lower than with the stomach empty. It is not certain that the line is lower in the majority of cases than the level of the iliac crests. The stomach when partly filled with water extends toward the right. The greater curvature is elevated at first, but then descends. In the horizontal position the light area moves plainly in inspiration. Standing, the displacement is slight, and in case the stomach is low down not present. In the rare cases of complete ptosis the motion is slight even in the horizontal position.

As regards pathological conditions the author says: Transillumination is able to define the position of a gastric tumor and to furnish some evidence as to its transparency, and sometimes to make probable the presence of a tumor that could not otherwise be demonstrated. The method can also assist in the recognition of a tumor of the edge of the liver, or an enlargement, tumor, or displacement of the spleen. An enlargement of the stomach can be made out by transillumination; a displacement can be claimed only where at the same time a marked motor disturbance can be demonstrated. A slight motor disturbance—gastric atony—can perhaps be demonstrated by the slight difference in the degree of mobility, by partial and complete filling with water, and by the failure of the greater curvature to rise when a small amount of water is introduced. If the upper border of the light area is separated from the liver by a dark zone which does not belong to the stomach, we can diagnose a gastropnoxis. A low position of the greater curvature may be due to: 1. A physiological megalogastria. 2. A pathological dilatation. 3. Gastropnoxis. 4. A combination of the latter with one of the two others.

The respiratory mobility of the light area is not sufficient in differential diagnosis, as dilatation and megalogastria both cause limited mobility in the upright position, and the mobility is present in gastropnoxis of mild grade. Abnormal conditions of the stomach, such as vertical position and loop-shape, can sometimes be recognized.

Finally, the author emphasizes the necessity of employing all the methods of diagnosis, as transillumination does not replace them, may often lead to error, and can often be dispensed with.

Hæmochromogen as a Blood Test, with Especial Reference to the Detection of Blood in Urine.—For converting blood-coloring matter into hæmochromogen, DONOGANY makes use of pyridin and observes the color-change, or makes a spectroscopic examination. About 10 c.cm. of urine are treated with 1 c.cm. of ammonium sulphide and 1 c.cm. of pyridin. An orange color appears, especially distinct if looked at from above toward a white background. If the urine is very dark a control must be compared with the test. It is still better if the urine can be examined spectroscopically. If the ammonium sulphide and pyridin are old, they give a green or brown color to the urine, changed to yellow by the addition of ammonium hydrate. Feces and vomitus are to be dissolved in 20 per cent. caustic soda solution, the pyridin added, and the filtrate examined spectroscopically. Sputum is to be boiled with caustic soda until dissolved.

Control tests show that the spectroscopic method can show oxyhæmoglobin

in a dilution of 1:2000; Heller's test in 1:4000. Hæmochromogen can be recognized by the direct method in about the same proportion as by Heller's test, but by the spectroscope in dilution of 1:8000.—*Archiv für path. Anat.*, Bd. cxlviii. p. 234

Alimentary Glycosuria after Beer-drinking.—KREHL (*Centralblatt für inner Med.*, 1897, No. 40) has made some interesting observations. Kratschmer had previously noticed that in many persons sugar appeared in the urine after drinking beer. Krehl made examinations on the Jena students. The proportion of these in whose urine sugar appeared varied much with different kinds of beer, but was much greater after the morning drinking (*Frühsehoppen*). Out of fourteen who drank bock or export beer in the morning, five had glycosuria. After the evening drinking, amounting in one case to seven litres, out of nineteen only one had sugar in the urine, or with Bavarian beer one out of eleven. The individual disposition was very evident. Not those who drank most had glycosuria. The difference between morning and evening drinking was probably due to variations in the absorption. As von Strümpell and Strauss have shown, alcohol favors the development of alimentary glycosuria, but Krehl thinks this is not the only cause of the results now reported. Krehl does not venture an opinion as to the nature of the process involved.

On the Mechanism by which the First Sound of the Heart is Produced.—SIR RICHARD QUAIN (*The Dublin Journal of Medical Science*, August, 1897, p. 97) publishes the results of a study he has made regarding the production of the first sound of the heart. He accepts the explanation generally given for the causation of the second sound: that it is the result of the sudden tension of the semilunar valves caused by the resistance which these valves offer to the retrograde flow of the blood from the aorta and pulmonary artery respectively into the ventricles on the cessation of systole.

Whereas, this explanation of the cause of the second sound is universally accepted, that of the first sound is, on the other hand, still much discussed and undecided. The view generally held, that the first heart-sound is produced by the closure of the auriculo-ventricular valves and the muscular contraction of the ventricular walls, Quain does not accept. He believes that the true explanation of the production of the first sound is that it is caused by the impact of the blood driven by the action of the muscular walls of the ventricles against the block produced by the columns of blood in the pulmonary artery and aorta, which press upon the semilunar valves. Sounds resembling the first (and second) sound of the heart can be produced artificially in accordance with this view.

The writer states that this explanation of the cause of the first sound of the heart, being so different from that hitherto accepted, may seem calculated to create difficulties in the diagnosis of valvular diseases of the heart. He believes, however, that a closer consideration will show that it will be found to simplify and not to confuse. It will afford an explanation for certain morbid phenomena which are at present unintelligible, such, for example, as that a systolic murmur may be heard at the apex while the first sound is audible at the base free from murmur. He thinks it will serve to encourage

a closer study of the relation between muscular contraction of the walls of the heart and the tension of the vessels of the system.

The Pathogenesis of Syringomyelia with Special Reference to its Relation to Trauma.—SCHULTZE (*Berliner klin. Wochenschrift*, October 4, 1897, S. 867) in summarizing the etiological factors in the production of syringomyelia states the following:

That the problem of the origin of syringomyelia is not yet satisfactorily solved. The disease has no constant and uniform causation, but is probably due to a variety of causes.

Undoubtedly a certain percentage of cases occur as a result of anomalies of development.

In association with such anomalies or independent of them, the disease may arise as a result of centrally situated gliomata and primary glioses with cavity formation.

Traumatism, leading to hemorrhages with subsequent softening of the hemorrhagic areas, is also an etiological factor.

The rôle which inflammatory processes as well as the narrowing and closing of bloodvessels play requires further investigation.

Pressure, from various causes, plays but a very small part, excepting in the production of hydromyelia.

Infectious diseases of various kinds may play a part in the etiology. Schultze does not believe that the disease occurs in leprosy infections.

The view that there is an association between syringomyelia and an ascending neuritis is not sufficiently supported by facts to receive much attention.

Remarks on Suppurative Cholangitis with Reference to Influenza as a Cause.—MAYO ROBSON (*Quarterly Medical Journal*, October, 1897, p. 47) states that gall-stones are the most frequent cause of suppurative cholangitis, "the disease then being a sequel of infective cholangitis, a less serious, more chronic, and distinctly curable ailment." Besides gall-stones, hydatid disease, cancer of the bile-ducts, typhoid fever, and influenza may cause suppurative cholangitis, and the writer further suspects that the disease not infrequently accompanies other acute infectious ailments.

Previous to a case occurring in his own practice, Mayo Robson does not think that influenza has been noticed as a cause. The case occurred in a woman, sixty-two years old, who had within a short time previously suffered from an attack of influenza. The symptoms of cholangitis were characteristic. Robson believed that influenza was the exciting cause of the attack, for, although gall-stones had been present for years, they had given no trouble for some time before the influenza led to the acute illness which terminated fatally. No reference to a bacteriological examination is made regarding this case. Robson says: "The afore-mentioned diseases may be more truly termed predisposing, since the true exciting cause is the presence of pyogenic organisms within the biliary passages."

The symptoms of cholangitis are then described, and finally the treatment is taken up. The writer states that cholecystotomy should be performed wherever practicable, and free drainage established until the bile is sterile.

Opening of the gall-bladder is followed by a number of therapeutic results: 1. The septic contents of the gall-bladder are evacuated. 2. Calculi, which are most frequently present there, are removed. 3. The other biliary passages, more or less obstructed, either by calculi or by swelling of their walls, are rendered as free as possible. 4. The septic bile is allowed to escape, and mechanically washes out the lower passages, carrying away through the drainage-tube many of the infectious particles. 5. The relief of pressure prevents absorption of the septic elements. 6. The relief to the kidneys, by allowing the bile to pass freely, is also of importance, as they are thus enabled to perform their function more freely in relieving the system of septic and other materials.

The occurrence of a localized abscess of the liver should be followed by free opening and drainage. Medicinal remedies, while affording some amelioration, will probably only give temporary relief.

Leucin and Tyrosin in the Urine in Erysipelas.—DR. THOMAS S. KIRKBRIDE, Jr., makes a valuable contribution to our knowledge of leucin and tyrosin, the history of which has been full of contradictions and untrustworthy statements.

Kirkbride examined the urine of a patient with facial erysipelas, without symptoms or signs on the part of the liver. The urine contained (febrile) albumin. Toward the end of the disease crystals of leucin and tyrosin were found. The urine was acid. In order to positively determine the nature of the crystals they were obtained separately by appropriate chemical procedures and in considerable quantity. The possibility that the leucin and tyrosin were formed from decomposed albuminous substances after leaving the body seems opposed by the fact that the urine had been preserved with formaldehyde, but further investigations on the subject are promised.

Tendency to Bending of the Bones in Cretins under Thyroid Treatment.—TELFORD SMITH (*The Lancet*, October 2, 1897, p. 853), in referring to the rapid growth of the bones of cretins while under treatment with thyroid preparations, speaks of a feature that has been repeatedly observed, namely, a tendency of the bones of the lower extremities to become bent. He gives photographs of a cretin girl at fifteen and a half and seventeen and three-quarters years of age. During the two and a quarter years the patient was under the thyroid treatment, and grew seven and a half inches. The under extremities, particularly the tibia and fibula, in the mean time became markedly bowed, as is shown in the second photograph. The explanation given for this is that under the treatment the rapid growth of the skeleton leads to a softened condition of the bones, resulting in a yielding and bending of those which have to bear weight. As cretins under treatment become much more active and inclined to run about, this tendency to bending has to be guarded against. In this connection it is interesting to note that rickets has been produced in rabbits by Hofmeister, and in sheep and goats by von Eisenberg, by removal of the thyroid gland. Whereas, in rickets, however produced, there is perverted and delayed ossification, resulting in softening and bending of the bones, under thyroid treatment in cretinism there is rapid resumption of growth in the skeleton, leading to softening,

which is most marked in the long bones and at the epiphyses. Telford Smith, therefore, recommends that cretins under thyroid treatment should be watched for any commencing bending of the bones of the legs, and if such appears the child should for a time be hindered from walking or the legs supported by light splints.

SURGERY.

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Closure of Perforations of the Stomach by the Suturing-in of Omentum.—In performing a gastro-enterostomy upon a patient who had suffered for some time with gastric ulcer and apparently had a pyloric stenosis due to contracture of sears, BRAUN (*Cent. für Chir.*, No. 27, 1897) found that there had been a recent rupture of the stomach. There were numerous fresh adhesions which so bound down the stomach that it was impossible to bring it to the parietal peritoneum; the tissues, on account of the ulcers, were so fragile that they would not retain sutures, and it was, consequently, impossible to close the tear by any of the ordinary methods. He therefore brought up a fold of the great omentum and sutured it over the opening, the gastro-enterostomy was completed, the periosteum washed out, and the abdomen closed. The patient made a good recovery, and in the three and one-half years since that time has enjoyed good health. "This means, therefore, of closing a tear in the stomach has had a fair test; from other cases, which have since been reported, it would seem a method which, where it is necessary, is capable of rendering good service."

Osteoplastic Opening of the Orbital Cavity for Resecting the First Branch of the Trigemini.—CAHEN (*Cent. für Chir.*, No. 27, 1897) describes the following method of operating for a deeper resection of the supra-orbital nerve after an unsuccessful operation for neuralgia. In many cases the ordinary operation does not secure the desired result, and both patient and doctor are unwilling to take the risk of a removal of the Gasserian ganglion; in these cases the author has employed and advises this operation, which has been successful in his hands.

At either end of the longitudinal incision employed in the ordinary opera-

tion, two perpendicular incisions are carried upward, and a flap is raised of skin, periosteum, and bone, which has its base upward. The remainder of the spongiosa and the tabular vitrea of the frontal bone is removed to the extent covered by the flap, the dura mater exposed, and after careful raising of the dura the orbital wall is laid bare. With a small chisel and bone-forceps the wall of the orbital cavity is removed from the orbital margin backward. This exposes the nerve, which is resected as far back as possible; the wound is then packed with iodoform-gauze and secondary sutures inserted. This method, the author believes, will be useful in many cases where entrance into the orbital cavity is desired.

The Application of the X-rays to the Diagnosis of Traumatism of the Elbow.—The diagnostic value of the skiagraph in cases of injury involving the elbow-joint is fully appreciated by QUÉNU (*Rev. de Ortho.*, July, 1897), who reports a case that had been diagnosticated by one physician as a posterior luxation, and by another as a fracture. At the time he saw it the œdema was so great that it was impossible to determine exactly the relation of the bones; the olecranon alone was accessible, and it appeared to be in its normal position, or at least only slightly elevated. The contraction of the muscle prevented the least motion without intense suffering. A skiagraph was made, and the ulna was shown to be in a state of subluxation, the former attempts at reduction having been only partially successful. He succeeded readily in reducing the luxation, but there was so much swelling that it was impossible to definitely determine whether the reduction was complete. A second skiagraph showed that full reduction had been secured. The author says that the painlessness of this diagnostic method, its certainty and harmlessness make it of great value and almost a necessity if the surgeon would treat fractures involving joints with the greatest care and precision.

The Treatment of Exophthalmic Goitre by the Resection of the Cervical Sympathetic.—GÉRARD-MARCHANT and ABADIE (*La Presse Méd.*, July 3, 1897) base this operation upon the theory that exophthalmic goitre is due to a derangement of the cervical sympathetic nerves, especially an excitative of the vaso-dilators of the cervical sympathetic. The authors believe that the accidents generally following an either partial or total excision of goitre are due to the sympathetic nerves and not to any derangement or poisoning of the system by the secretion of the thyroid gland. The hemorrhage that is so troublesome in these operations they believe to be due to the condition of the vaso-dilator nerves. The case reported of excision of the cervical sympathetics on both sides is as follows: The patient presented the symptoms of exophthalmic goitre, the exophthalmia being the most pronounced, although there was a considerable enlargement of the thyroid gland. The line of incision was from the mastoid in a line directed toward the inner third of the clavicle; it passed posteriorly to the sterno-mastoid; this muscle was drawn anteriorly, and with it the nerves and arteries of the neck, after the resection of the external jugular vein and certain fibres of the superficial cervical plexus. The sympathetic was seen as fine filament upon the prevertebral aponeurosis of the anticus longus muscle of the neck. This was, however, not sufficient to differentiate it, and it was followed up to

the superior cervical ganglion. About an inch of the nerve was then resected. The same operation was performed on the opposite side. The patient had no disagreeable symptoms; there was a dilatation of the pupils, but no untoward symptoms of either respiration or heart-action.

There was noted a dilatation of the subconjunctival bloodvessels on the right side after the section of the sympathetic on the left side, which accords with the physiological experiments of Dastre and Morat.

The result attained was very marked; the patient had been unable to close the eyelids on account of the exophthalmia; they gradually receded, and at the end of ten days, when she was discharged, the eyelids closed readily over the eyes.

In direct contrast to the result obtained in the previous case, is that reported by CHAUFFAUD and QUÉNU (*Ibid.*): A patient who had marked exophthalmia and an enlarged thyroid, with all the symptoms of Basedow's disease, was operated on by Jaboulay's method, and both superior cervical ganglia of the sympathetic removed. The operation apparently had no influence upon the disease, the exophthalmos remaining practically just as marked, and no alteration being noted either in the size of the goitre or the pulse or respiration.

The authors do not contend that this one case demonstrates absolutely the inefficiency of this method of treatment, but they believe it should modify the enthusiastic reports of success as given by Jaboulay and others.

The Place of the Murphy Button in Gastro-enterostomy.—MEYER (*Annals of Surgery*, July, 1897), after a critical review of the cases operated upon with the use of the button, and the detailed report of his own cases, arrives at the following conclusions:

1. For gastro-enterostomy Murphy's anastomosis button is the best artificial contrivance up to date. It hastens and simplifies the operation; it enables the patient to be fed through the mouth right after the operation; the anastomosis is still feasible with its help where proper suturing is impossible. We can thus do the operation successfully with the button where otherwise we would have to abandon the same when only using needle and thread. The anastomosis made with it does not contract.

2. In using the button, posterior gastro-enterostomy (Von Hacker's operation) is preferable to the anterior one (Woclfiler's), because it favors the progress of the button toward the anus. In both methods, however, the button can drop in the stomach.

3. The presence of the button within the stomach has so far never done any actual harm. This accident is, therefore, not to be considered a drawback to the use of the button.

4. In all cases where reduction of time of the operation is considered of importance, the use of the button is indicated and not the suture.

5. There is no reason borne out by practical experience which should prevent us from making use of the advantages of the button in every case of gastro-enterostomy for malignant disease.

6. If the button be used great emaciation of the patient is no more a contraindication to this operation than it is to gastrostomy in cancer of the œsophagus.

7. On account of the possible entrance of the button into the stomach, gastro-enterostomy in cases of benign stricture of the pylorus should be done with the help of the suture.

Surgical Treatment of Tumors of the Liver.—The literature of this subject and the rapid advances which have been lately made in the operations upon tumors of the liver are carefully studied by ELLIOTT (*Annals of Surgery*, July, 1897), who reports an interesting case of alveolar sarcoma which he successfully removed. The patient recovered, but died three months later from a return of the disease in the intestines.

The author summarizes the present status of the operative treatment of these tumors as follows: The symptoms are always obscure; frequently there was pain at the site of the tumor, but its position varied and had no bearing usually upon the diagnosis. The tumors were generally quite movable, even when connected by a broad base, and usually more so in a lateral direction than up and down. They all moved with the respiration. Palpation occasionally showed a direct connection with the liver; but in more than half the cases percussion showed a tympanic zone between the tumor and the liver.

The diagnosis was made in only a few cases. These tumors were mistaken for tumors of the pancreas, mesentery, omentum, pylorus, colon, ovary, and kidney. A tumor of the right lobe can often be grasped with one hand in the loin, and the other in front and moved freely about; under such circumstances it may feel exactly like a kidney, as in the author's case, but when, in addition to this, the urine contains casts, renal epithelium, etc., an error in diagnosis is inevitable.

Operative technique: In the majority of cases reported the liver-substance was cut with the thermo-cautery, and the large vessels tied. In a few cases the knife or scissors was used. In several cases the stump was strangulated with an elastic ligature or tied in sections with silk. Gauze pressed against the wound was often effective in stopping the general oozing.

There are four methods of treating liver wounds: (1) Closing the abdomen after stopping the bleeding, and sewing the liver wound when possible, and dropping the stump (intraperitoneal). The cases show this to be a very unsafe method, except, possibly, for small tumors.

(2) Operation in two sittings. Extraperitoneal. Tillmans fixed the liver in the abdominal wound and destroyed the growth with the cautery. Luke fastened the pedicle into the abdominal wound and surrounded it with an elastic ligature; it was cut away on the ninth day with cautery. Terrillon used the same method. Lannenstein operated in two stages, and the patient died on the twelfth day of septicæmia. Küster reports a death from septicæmia due to this method.

(3) Fixing the stump into the abdominal wound (extraperitoneal). In many cases the stump, having been tied in sections or even with an elastic ligature, was sewed into the abdominal wound, and allowed to granulate under an iodform gauze dressing. This method has the serious defect that the liver is pulled out of its position, which may injure the organ; it also causes a constant tendency to tear out the stitches—every respiratory movement pressing directly on the wound.

(4) Liver wound packed with gauze and dropped into the abdomen. A peritoneal wound partly closed (intraperitoneal). The author followed this method, ignorant of its previous use, and carried it still further by walling off the rest of the abdominal cavity. This gauze packing is one of the greatest advances in abdominal surgery, and the author feels certain it will prove itself of value in these cases when applied as in other abdominal surgery.

The best procedure, the author believes, is to use a rubber tube for a tourniquet; if necessary, to tie all large vessels separately, using pressure for the oozing; to close the liver as much as possible with sutures; to drop the stump and to surround it completely with sterile gauze, packing iodoform gauze against the liver wounds, and leave the abdominal wound sufficiently open to facilitate dressing the liver wound.

Treatment of Tubercular Cystitis.—BANZET (*Ann. des Mal. des Org. Genito-urin.*, June, 1897) calls attention to the fact that there are many cases of local tubercular disease of the bladder which are not recognized, or not sufficiently early, and that they go on to a general tubercular infection of the entire system. The early recognition and treatment of this condition will result in permanent cures of numbers of cases that now die of general tuberculosis.

The treatment of this condition he summarizes as follows: The treatment should be in the main medical and the treatment of the system. This is difficult, as the patient does not realize the necessity, and frequently such cases are considered cases of albuminuria, and are put upon a milk-diet, much to their disadvantage.

A cure can be obtained in these cases by a purely medical treatment. Local treatment properly applied is indicated in all cases, and is of advantage.

Topical applications are useful from the outset; sublimate in small doses gives excellent results. The other topical applications, so far, seem inferior. Guaiacol has the advantage of relieving the local pain and irritation at the same time.

Operative interference is indicated for the subjective phenomena of intense pain and frequent micturition, which cannot be relieved by the other treatment.

Curettage of the neck of the bladder by a perineal fistula in the male, by the urethra in the female, followed by prolonged free drainage, is of particularly great value. These two procedures produce, in the majority of cases, a marked diminution or suspension of the pain, as well as a general improvement; the local amelioration is often very considerable, and is, so to speak, a *enre*, especially in the female.

The suprapubic cystotomy is reserved for cases where the former modes of treatment and renewed topical applications have proved inefficient, and, in the author's opinion, is never the operation of choice.

The vesico-vaginal fistula is only to be employed in the female in cases which present an intensity in the functional symptoms that is very marked and is accompanied by great pain, and after all other resources have failed.

Operative procedures are for the relief of functional derangement and pain, and are not contraindicated by general infection or a markedly debilitated condition of the patient.

Prostatic Hypertrophy.—In discussing the results obtained in eighteen cases of operation for hypertrophy of the prostate, LENNANDER (*Cent. für Chir.*, No. 22, 1897) says that he finds no further indication for a double castration than the presence of incurable disease or pathological change and neuralgias, and in these cases resection of the vas will often result in a cure. The cases of resection produced better results than those of castration, but as a systematic treatment by catheterization accompanied the vasectomy in all but one case the result may be partially attributed to that cause. In one case of a patient, seventy years of age, who had suffered from partial retention with dilatation and cylindruria, but without urinary infection, for three years, a double vasectomy produced after eight months lasting subjective and objective improvement, without the employment before or after operation of catheterization.

In such cases of dilated bladder without infected urine, and with partial urinary retention, the author believes that vasectomy can be of great value, if it is made the rule not to use a catheter except under the greatest provocation.

In cases which do not yield to catheter treatment rapidly, at least in their more marked symptoms, the author would advise vasectomy. When the cystitis, however, is rapidly making progress toward the kidneys, suprapubic cystotomy should not be delayed and may be combined with vasectomy, in the hope that after the cystitis is cured the resultant effect upon the prostate may make urination easier. In chronic urinary difficulty with dilatation of the bladder and complete retention, but without infection, it must be considered whether it would not be better to resort to suprapubic aspiration and vasectomy, and thus avoid catheter treatment and a possible cystitis.

Following out an old theory that the result of vasectomy was produced by the section of the nerves, the author in all cases includes as much of the connective tissue surrounding the cord as possible, and finds that the resected portions contain a large number of nerves in the connective tissue.

Prolonged Drainage of the Bladder per Urethram.—After a careful clinical study of a number of cases of varying character, ESCAT (*Ann. des Mal. des Org. Genito-urin.*, June, 1897) finds that the following results may be obtained by prolonged drainage of the bladder by means of a retention catheter.

The catheter can be tolerated by the urethra for months, and even years, without serious inconvenience, and during that time the entire urinary apparatus and organism are markedly benefited.

In cases of chronic retention where it has been necessary to employ continuous drainage, it is of advantage to allow the catheter to remain *in situ* until the entire system is completely restored to the normal. The apyrexia and disappearance of the signs of intoxication or infection are not sufficient, even with the aspect of the urine, to make it certain that the change from continuous to interrupted drainage will not be followed by a relapse. The change should not be made until, after due consideration of the causes and pathological changes which produced the trouble, it is found that the system has entirely regained its normal, and is free from danger and from the sequelæ which follow retention.

Without having either the acute or late disadvantages of a suprapubic cystotomy, it produces the same results without the inconvenience of the urinary fistula in cases of enlarged prostate.

Combined with a walking treatment, with either an open or a closed catheter, it assures in cases of chronic retention a very tolerable condition, and opens the way to unexpected ameliorations.

There are certain pathological deformities of the bladder and urethra in the prostatic portion which are inaccessible to this mode of treatment.

This method of drainage is readily established and well supported for an unlimited length of time.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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Disinfection of the Conjunctival Sac.—A. DALEN (Stockholm) has made an extensive experimental study of the disinfection of the normal conjunctiva in thirty patients, mostly cases of cataract. He especially compared the results obtained with solutions of corrosive sublimate and common salt used to irrigate the conjunctiva, and found that they were equally ineffective in freeing the conjunctiva from bacteria. He also found that bacteria would flourish and multiply as well under a dressing moistened with sublimate as under a similar dry dressing.—*Nordiskt Medicinskt Archiv.*, 1897, Hefte 3.

LUDWIG BACH (Wurzburg) found that a mechanical cleansing of the conjunctiva and lid margin and simultaneous irrigation with an indifferent liquid have far more effect in diminishing the number of germs present than irrigation with the best antiseptics. He has not obtained a greater percentage of sterile conjunctivas by using bichloride, 1 : 5000, than by using an indifferent salt solution.

He also experimented as to the danger of infection when operating on the cornea with an infected conjunctival sac. In fifty rabbits whose conjunctival sacs were inoculated with cultures of staphylococcus, a penetrating wound 6 to 8 mm. long was made in the limbus with a sterilized curved lance. Of twenty-five cases in which the inoculation was made before the operation, infection took place in five. Of twenty-five cases inoculated after the operation, infection took place in two. In ten experiments with an infected knife, the eye became infected and was lost in nine.—*Archives of Ophth.*, October, 1897, p. 519.

J. EYRE (London) made a study of the bacteriology of the normal conjunctival sac, making cultures from 150 eyes, seventy-five of which he found yielded no colonies of bacteria. In those which did yield bacteria, twenty-eight different forms of micro-organisms were identified.

He concludes: 1. The conjunctival sac frequently contains micro-organisms, extremely varied in character, which may or may not be pathogenic. It may be sterile at the particular moment an observation is made. 2. When considered as divisible into an upper and a lower fornix, the former is much more frequently sterile than the latter. 3. The sterility of the conjunctival sac is due to the mechanical flushing of its mucous surface by the lachrymal secretion—aided, perhaps, to some slight extent by the bactericidal action of that fluid.—*Annals of Ophthalmology*, October, 1897.

R. L. RANDOLPH (Baltimore) experimented upon 100 cases with normal conjunctivas, and found the normal conjunctiva always contains bacteria. Of these the staphylococcus epidermidis albus must be regarded as a regular inhabitant. Bacteria found in this locality are usually of only slight if any pathogenic power. But bacteria, ordinarily non-pathogenic, may become harmful under certain favoring conditions, such as the bruising of the tissues by instruments or the irritation resulting from chemical substances.

Neither the irrigation with sterilized water nor the instillation of a sublimate solution (1 : 5000) produces sterility of the conjunctiva, and they may as well be abandoned.

The most important essential of a germicide which is to be used upon the conjunctiva is that it be absolutely free of irritating properties; and, furthermore, it should be demonstrable that this germicide will destroy the germs most commonly met with in the normal conjunctiva.

In operating upon the normal conjunctiva, as in cataract operations, the surgeon, in the present state of our disinfecting armamentarium, would do well to consider the subject of antisepsis and asepsis chiefly, if not solely, in connection with the hands, instruments, cocaine, and atropin.—*Archives of Ophth.*, 1897, vol. xxvi. No. 3.

H. D. NOYES (New York) employs the following method for the disinfection of the conjunctival sac:

The lids being separated by the speculum, the conjunctival sac is thoroughly flushed with a 2 per cent. solution of boric acid or the physiological salt solution. The stream from the rubber bulb is directed especially into the cul-de-sac above and below, into the semilunar fold, and into the outer angle. Shreds of secretion may be caught by the speculum, and great pains must be taken to remove all such material. By this proceeding all coarse flocculi are removed, and this is all that can safely be attempted.—*Medical Record*, October, 1897.

[While there may be some question as to whether anything is gained by irrigation of the normal conjunctival sac, experimental studies and practical experiences agree that there is no advantage in using an antiseptic that is in the least irritating.—ED.]

Albuminuric Retinitis.—J. W. H. EYRE (London) reports two cases which seem to throw some doubt upon the common belief that retinal lesions only appear at a late stage of kidney disease. A man, aged fifty years, when first

seen had impaired vision and the typical ophthalmoscopic picture of albuminuric retinitis; but his urine, though of low specific gravity, was free from albumin or casts, and remained so for ten days. These appeared coincident with a diminution in the quantity of urine, and he died within two months of uræmia. The kidneys post mortem exhibited a typical picture of acute Bright's disease.

The second case, a woman, aged thirty-seven years, had impaired vision and albuminuric retinitis, but the urine was found normal. Eleven days later tube-casts were first discovered, with albumin, and general anasarca occurred. She subsequently made an incomplete recovery.—*Ophthalmic Review*, 1897, p. 275.

[May not such cases indicate that if retinitis is a late symptom the kidney changes may also be a late symptom of advanced general vascular disease? —ED.]

Tobacco Amblyopia, with Slow Improvement.—A. H. THOMPSON (London) reports four cases occurring in men from thirty-six to fifty-four years of age, who, during the periods of treatment, all denied that they were smoking or chewing at all.

In the first case vision equalled 6/LX, and no improvement took place for three months. Seven months later a cure was complete. In the second case vision equalled 6/LX. There was no improvement for three months, but in six months one eye had vision of 6/XVIII.

In the third case vision was: Right, fingers 2 ft.; left, 2/LX. There was no definite improvement for seven months, when the left eye showed improvement in the color scotoma, and later for test-type, and at the end of nine months had gained vision of 6/XVIII. In the fourth case, vision 3/LX, no noticeable improvement had taken place at the end of one year, yet at the end of the second year perfect vision was restored to each eye.—*The Royal London Ophthalmic Hospital Reports*, vol. xiv. Part II.

Detachment of the Retina.—SCHMIDT-RIMPLER (Göttingen) opposes the theory that detachment of the retina is commonly due to traction by fibres newly formed through previous disease of the vitreous. The tears in the retina, of which this theory makes so much, are not found in the majority of cases, and there is not the homogeneity of the preretinal and subretinal fluids which this theory supposes. The difference between the two fluids is found on anatomical examination, and is proved in the mass of cases by the tendency of the subretinal fluid to gravitate to the lower part of the eyeball.

Then the traction theory does not suit cases in which the retina becomes reattached and again detached; nor the detachment due to traumatism, anaemia, phlegmon of the orbit, albuminuric retinitis, etc., without previous disease of the vitreous. He answers objections to the secretion theory, and explains that sudden appearance of symptoms may not be due to suddenness of exudation, while the idea that retinal detachment is always accompanied by decreased tension has been abandoned.

The traction theory may, however, correctly explain some cases of detachment following disease of the vitreous. Schmidt-Rimpler opposes such treatment as division of the supposed vitreous fibres, or injections into the

vitreous of iodine, or dilute vitreous from the rabbit. He favors the pressure bandage, dorsal decubitus, diaphoresis, mercurialization, scleral puncture, and treatment proper to choroiditis.—*Dent. Med. Week.*, 1897, No. 44.

Ivory Exostosis of the Orbit.—W. F. NORRIS (Philadelphia) reports a case of this disease in a man, aged twenty-four years, who had noticed the tumor for six years, and attributed it to a blow received four years before that. The symptoms for which he sought its removal were occasional severe headaches and dizziness. The movements of the eye were limited outward and upward, causing diplopia in the corresponding portion of the field. On its removal the base of the tumor was found to involve most of the orbital plate of the ethmoid and a portion of the lachrymal bone. The dizziness and double vision were entirely relieved, and the patient remained well fourteen months after operation.—*Transactions of the American Ophthal. Society*, 1897, p. 67.

R. SATTLER (Cincinnati) made a supplementary report on a case of ivory exostosis. He found a fistulous opening remaining eight months after the first operation. On investigating it was discovered that an additional exostosis existed, which had pushed the orbital plate of the frontal bone upward, and had hollowed out a large cavity for itself, completely concealed above and behind the overhanging orbital margin. The orbital plate of the frontal bone had yielded to the pressure of the growth, so that a cavity fully as large as a pigeon's egg had resulted, and the plate was so thin that at the time of operation brain pulsation could be distinctly observed. Recovery, however, was prompt and complete, without any brain symptoms.—*Transactions Amer. Ophthalmological Society*, 1897.

The Diagnosis of Ocular Paralysis.—A. DUANE (New York) points out that this is based partly upon the characteristic restriction of the movements of the affected eye in some particular direction, and partly upon the relations of the double images. In either case it depends upon the fact that, in order to move the eyes in any given direction, a special muscle or set of muscles is brought into play in each eye, which muscle or muscles move their respective eyes at precisely the same rate, and which gradually cease to act as the eyes are carried in the reverse direction. While in all pronounced cases of ocular paralysis the lagging of the affected eye behind the other in the performance of associated movements is easy to recognize, the most satisfactory and certain evidence of the trouble is obtained from the double images. For determining these, the following method probably gives the most accurate results.

The patient is placed (preferably in a dark room) with his head fixed and with his eyes in the primary position—i. e., with both directed straight ahead and on a level, and a red glass is placed before one eye. A lighted candle, which, in order to avoid the disturbing effects of projection, should be not less than three or four feet from the patient, is carried successively to the right, left, up, down, and obliquely, and the patient is asked whether he sees two images of the flame, what is their color, how they are placed with regard to each other, how far they are apart, and whether the distance between them increases or diminishes as the candle is carried in each direction. If he sees one flame (yellow, with a pinkish border), he has binocular single

vision. If he sees one flame, which, however, is pure red or pure yellow, he probably has double vision, but ignores one of the images (monocular vision). If he sees two flames, one red and the other yellow, he has diplopia, the nature of which is indicated by the relative position of the red and the yellow flames.—*Archives of Ophthalmology*, 1897, p. 317.

OTOLOGY.

UNDER THE CHARGE OF

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Caries of the Recessus Hypotympanicus.—KRETSCHMANN maintains that disease of the recessus hypotympanicus or the "cellar" of the drum cavity, is more frequently the seat of necrosis than has been supposed (*Verhandl. der Deutschen Otol. Gesellschaft*, 1897). This lesion is rarely an isolated one, being commonly found in conjunction with caries and necrosis of other parts of the middle-ear cavities. Sometimes caries of the floor, or "cellar" of the drum-cavity, runs inward under the labyrinth wall or outward under the floor of the auditory canal, beyond the plane of the annulus tympanicus. Sometimes carious spots in the hypotympanic space may be recognized with a probe before radical exposure of the region by operation on the posterior inferior wall of the drum-cavity; but often caries in the tympanic cellar is not discovered until the so-called Stacke operation has been performed upon the attic and antrum. Kretschmann has found caries of the hypotympanic space so often in connection with caries of the epitympanic space, or attic of the drum-cavity, that he feels in most cases, to make a radical operation really what it is called, the hypotympanic space must be reamed out at its posterior portion after the surgical exposure of the attic and antrum. He prefers in some ways revolving (cylindrical) burrs to the chisel and hammer for the hypotympanic operation. Ten of his operations, the first half of his series, have been performed with hammer and chisel; the remaining ten, with the burr. He admits that surgical work in this region comes very near the jugular bulb in the front part of the floor of the drum-space and close to the facial canal in the posterior part of the cavity. The jugular bulb is not threatened, however, as often as the facial canal, because caries of the cellar of the drum-cavity is more likely to be near the facial canal than over the bulb in the front part of the tympanic floor.

[The simple presence of caries anywhere in the drum-cavity, while the necrotic ossicula are present in whole or in part, is not sufficient reason for a radical operation exposing this cavity, before the two largest necrotic ossicula or their remnants are excised, because we have seen repeatedly large carious surfaces in the tympanic space cover in with normal healthy mucoperiosteum, and the discharge of pus from the drum-spaces cease permanently,

after excision of the necrotic ossicles, and all need of any form of surgical interference in this region cease. Therefore, in the absence of symptoms of a lesion of deeper parts—pain, fever, tumefaction, tenderness to pressure about the ear—surgical removal of the ossicles should precede by a long period more radical operations in or upon the drum-cavity. This alone may check all suppuration, and certainly act as a prophylaxis against thrombosis, meningitis, and cerebral abscess. If excision checks or greatly diminishes the otorrhœa, the mastoid operation becomes unnecessary.—Ed.]

Burrowing Abscess Beneath the Mastoid with Retropharyngeal Abscess after Acute Otitis Media.—HAUG reports the occurrence of the above-named lesion in a young man, aged seventeen years, whose ear had been previously normal. In this instance spontaneous perforation of the membrana tympani took place on the fourth day of the acute otitis. The disease was then treated by means of syringing with solutions of boric acid and insufflations of powdered boric acid, before Haug saw the case. On the eighth day the discharge suddenly ceased and the earache returned. A few days later pain and tenderness in the mastoid were observed, and fever, with general malaise, set in.

[Here is clearly an instance of secondary infection of the middle-ear and mastoid cavity, by an excessive and irritant therapeusis, so that it can be boldly stated that acute mastoiditis following acute otitis media is always the result of secondary infection, either from septic domestic treatment or a defective local therapeusis of the inflamed ear—i. e., it is an artificial production and not a necessary result of the acute otitis media.—Ed.]

Four weeks after the beginning of the otitis the discharge had ceased, the membrana contained a small nipple-like perforation behind and beneath the malleus, and the posterior superior wall of the auditory canal was prolapsed. The periauricular region was swollen and tender, and all motions of the jaw were painful. The head could not be turned, and the patient carried his head like one affected with torticollis. The infiltration beneath the mastoid extended backward to the occiput and downward to the clavicle. This swollen region was tender to the touch, the general condition of the patient was bad, his temperature being 39.9° C., his pulse 96–100, and he was semi-comatose. Two days later difficulty in swallowing was observed, but inspection of the pharynx revealed only hyperæmia on the left half of the soft palate and tonsil, the side of the affected ear. Paracentesis of the membrana was now performed, and a considerable quantity of pent-up pus escaped. The next day, however, though pus continued to flow from the drum-cavity, the general condition of the patient was worse. Therefore the mastoid cavity was opened, and the large pneumatic mastoid space thus laid bare was found nearly filled with pus and granulations. The antrum contained only pus. A probe could be passed from the bottom, or tip, of the mastoid cavity into a sinus leading into the tissues of the neck. A counter incision was therefore made, 3 cm. deep, along the posterior edge of the sterno-mastoid muscle until the deep fascia was reached, which being punctured, pus escaped. Notwithstanding an amelioration in the aural and nuchal symptoms, the fever did not subside, and the patient became more apathetic, soporose, swallowing became very difficult and painful, and dyspnœa set in. The left side of the

fauces was now found to be enormously swollen, temperature 39.8° C., and the pulse 112 and thin.

The case had now become one of pharyngeal or retropharyngeal abscess, and two days after the mastoid operation an incision beneath and behind the left tonsil, widened by the introduction of a probe $2\frac{1}{2}$ cm. into the tissues, gave vent to a coffeespoonful of thick, yellow pus. The bacillus pneumonice was found in the pus, coming from pharyngeal as well as from the mastoid abscess. Entire recovery in all respects, including the hearing, ensued in six weeks.

Treatment of Sclerosis of the Middle Ear with Thyroidin.—A. EITELBERG has published his results in the treatment of sclerosis of the middle ears with thyroid tablets in eight cases (four men and four women). Of these, one containing about five grains was given daily, for periods varying from thirty to eighty days. Bruhl, Alt, and Vulpius had already preceded Eitelberg with this form of treatment of aural sclerosis. Vulpius concluded that if no good results ensued in two weeks, the treatment should be abandoned. But Eitelberg maintains that at least a month's treatment is necessary before conclusions as to the results of such treatment can be formed.

In none of his eight cases had he any bad results, either in the ears or general system. In some of his cases there was great improvement in the general health. The age of the patients varied from thirty to fifty years. Some loss of weight occurred in two cases; the sexual impulse was quickened in three of the men, and a permanent improvement in hearing was obtained in three of the eight cases.

The author states that he was always on the watch for any disturbance in the general health, weakened heart action, and broken sleep. If any of these symptoms occurred the treatment was stopped for two or three days. Very rarely was it necessary, however, to make any pause in the treatment. In two cases, one man and one woman, subject to nervous palpitation of the heart, the treatment was borne surprisingly well.—*Archiv f. Ohrenk.*, vol. xliii. Part I.

Otitis of the Mastoid Process in Consequence of Infectious Otitis Externa.—HESSLER again draws attention to the fact that ordinary furuncles in the external ear differ greatly in their effects upon the subjacent bone from inflammations and ulcerations excited in the auditory canal by self-injury with instruments inserted into the meatus by the patients for scratching in cases of pruritus.

The cases presented by Hessler as illustrative of the above-named conditions were those of two women who had scratched their auditory canals with hair-pins to relieve itching. This act was repeated for several weeks, as the pruritus continued, and finally there occurred earache, malaise, chills and fever, with symptoms of mastoid empyema. Mastoid chiselling revealed in both instances a spongy, brownish, brittle condition of the bony structure of the mastoid cortex and cavity, but no inflammatory swelling of the epithelial lining, no secretion, and no caries.—*Deutsche med. Wochenschrift*, 23d year, No. 29.

[These cases demonstrate how easily a rough therapeutics of the acutely

inflamed auditory canal, by means of swabs, probes, and the like, may provoke an infectious irritation and inflammation of the soft tissues over the mastoid antrum and lower anterior cortex of the process, and finally produce a mastoid inflammation which, though considered a necessary result of the primary inflammation in the ear, is in reality a purely artificial production by rough treatment.—ED.]

OBSTETRICS.

UNDER THE CHARGE OF

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The Antiseptic Performance of Embryotomy.—In the *Centralblatt für Gynäkologie*, November 29, 1897, KOSMINSKI describes his method of performing embryotomy with the aid of specula which protect the walls of the cervix and vagina from contact with hands or instruments. He has devised large blades which form a speculum, each shaped somewhat like a spoon, and making it almost impossible to infect or injure the cervix or vagina. In craniotomy, having introduced his specula, he grasps the scalp with tenaculum forceps, incises it, and applies the perforator or trephine directly by means of sight. He is very careful to remove the brain completely, and to remove all pieces of bone without wounding the mother's tissues. He urges that it is much safer to perform craniotomy guided by vision than in the usual way. After the head has been emptied, the specula are removed and delivery accomplished by the cranioclast. He describes five cases in which the operation was easily and successfully performed.

He has also employed this method in cases of transverse positions in which decapitation and embryotomy were required. He has found great advantage in being able to see the tissues operated upon, and has been able to protect the mother especially from injury by the foetal ribs. He reports four cases of successful embryotomy by this method.

A Rare Case of Lithopedion.—In the *Bulletin of the Johns Hopkins Hospital*, November, 1897, CLARK reports a very interesting case of lithopedion. The patient was a colored woman, aged forty-five years. She complained of pains in the lower abdomen, enlargement of the abdomen, and dyspnoea. She had been married fourteen years and had three children, her labors having been complicated by adhesion of the placenta and slight fever after labor. Four years before admission to hospital menstruation ceased, and symptoms of early pregnancy developed. She became weak and miserable toward the end, and had to go to bed. Foetal movements were plainly felt. About the time for labor she had severe pain in the left side, and much watery fluid

passed from the vagina. She had declined operation previously. On admission, she was very constipated and mentally depressed. On examination, a hard tumor was found in the abdomen lying obliquely from left to right. Under anæsthesia the uterus was found normal in size, and on the right side a boggy mass in close relationship with the hard tumor.

On opening the abdomen, adhesions were found between the anterior abdominal wall and the back of the fœtus. Dense adhesion bound the gestation sac to the intestine. The placenta was necrotic. A mottled yellow tumor was found closely adherent to the abdominal wall. The fœtal head was in close contact with the spleen, and the left arm and shoulder near the umbilicus. The fœtus was lying obliquely in the abdomen, its chest close to the aorta. It was gently delivered by grasping the head, and the cord was cut close to the placenta, which was attached to the floor of the pelvis. The sac was densely adherent to the appendix, cæcum, and intestines. The sac was dissected free and enucleated with the right tube. The placenta was very friable and was removed piecemeal. The abdomen was irrigated with salt solution. The patient made a good recovery.

On examining the fœtus the skin of the face and forehead resembled burnt leather. The membranous envelope, probably the amnion, was attached to the fœtus, but could readily be separated. On examining the body of the child, saponaceous material could be found, also gritty particles.

Peripheral Neuritis in Pregnancy and the Puerperal State.—REYNOLDS (*British Medical Journal*, 1897, No. 1920) reports two cases of peripheral neuritis, one in pregnancy and one following labor.

The first was a patient, aged twenty-four years, who had such severe vomiting that abortion had to be produced. For two or three weeks after she could not control the bladder and rectum. About a month after the abortion sensation was impaired in the lower extremities. There was also complete loss of power, wasting, and contraction. The knee-joints were straightened under chloroform and fixed in splints. Under electricity and massage the patient improved. Her improvement, however, was very gradual, and before recovery ensued another pregnancy occurred, terminating in a normal confinement. Following this she became so much better that she could take short walks. In this case there was no previous history of alcoholism.

The second case was that of a patient who bore a child when she was eighteen years old. She had pyæmia and paralysis of the legs. The muscles were atrophied and the knees contracted. She made a recovery under the prolonged use of massage. A slight lameness remained from contraction of the toes. In this case also no history of alcoholism could be obtained.

Reynolds has collected forty-nine cases, excluding those unilateral caused by forceps or exudation into the pelvis. The disease is more common in multiparæ. One-fourth of the cases were during pregnancy, while in one-third there was a history of some form of sepsis. In eleven cases marked and incessant vomiting was present. It was not possible to trace a connection with alcoholism, and sepsis and incessant vomiting are the most potent causes. The disease began in the legs, then extended to the arms. The muscles were wasted and there were disturbances of sensation. In fourteen cases there was either no recovery, or but partial cure. In twenty-two cases

recovery was complete, while in thirteen no mention was made of the termination. The prognosis is worse when the paralysis is general, and best in the partial cases. As regards its pathology, degenerative neuritis has been found.

Ptyalism During Pregnancy.—LVOFF (*Centralblatt für Gynäkologie*, 1897, No. 29) reports two cases of multiparæ who suffered from excessive secretion of saliva. In both this occurred at the second month, and increased during the third. Both patients had laceration and erosion of the cervix. The secretion was so profuse that the patients were excessively annoyed by it.

In one case the cervix was cauterized, bromides and cocaine were given, and, later, atropine, with good results. In the second case this treatment was without result, and abortion was procured. This was followed by cessation of the salivation. The writer considers this disorder as akin to pernicious nausea, and thinks both are caused by retention of decomposed albuminoids in the blood.

Different Methods of Incising the Uterus in Cæsarean Section.—JOHANNOVSKY (*Monatsschrift für Geburtshilfe und Gynäkologie*, 1897, Band vi., Heft 4) reports two Cæsarean sections on the same patient, in which different methods of opening the uterus were adopted.

The patient was a woman, aged twenty-six years, having a rhachitic flattened pelvis. In the first operation the usual incision in the anterior wall of the womb was made, and the uterus closed with deep and superficial stitches of silk. During the recovery stitch-hole abscess occurred, and considerable formation of pus with prolonged fever persisted for three weeks. The patient made a good recovery, the uterus being the size of the fist, anteflexed in the median line, the fundus being just below the umbilicus. It was firmly adherent to the abdominal wall. There remained also a small fistula just below the umbilicus communicating with the uterus. This occupied the position of one of the stitches.

The patient disappeared from observation and returned again in the pregnant condition. She stated that she had had a seven-months' spontaneous labor, the child being dead. She had made a good recovery. She was then approaching the end of her third pregnancy. The fistula still remained, and was about the size of a horse-hair. In view of these facts it was determined to perform Cæsarean section again and to open the uterus on its posterior wall.

The abdominal incision was made on the right of the old scar, and the adhesions were separated by the finger excepting those about the fistula, where it was necessary to use a knife. The uterus was turned out of the abdomen, and an incision parallel to the long axis of the uterus was made on its posterior wall. The child was easily grasped by the feet, was asphyxiated, and could not be revived. The uterus was closed with silkworm-gut, and also the abdominal wound. The patient made a good recovery. The fistula closed, the uterus was anteflexed, the fundus two finger-breadths above the pubes. A slight fixation of the cervix on the right side was present. The pelvis, however, was otherwise free from adhesions. The patient was examined a year afterward and found in good health.

Incision of the posterior uterine wall was advised by Colnstein in 1881. It was, however, opposed, as it was urged that the absence of adhesions to the anterior abdominal wall would allow a more ready escape of the contents of the womb into the abdomen. It was also urged that adhesions between the uterus and the bowel might occur.

The classic method has consisted of incision into the anterior uterine wall. This has been thought safer, as the adhesion between the uterus and the peritoneum shuts off the uterine from the peritoneal cavity. As an objection to this incision, it is urged that it is so made that the stitches are inserted parallel to the bloodvessels, and hence the vessels are not securely ligated by the stitches.

Singer's method of incising the uterine wall near its junction with the cervix is of theoretical interest, but has never been accepted.

Fritsch has recently advanced the claim of the transverse incision across the fundus. Sufficient experience has not yet accumulated to inform us regarding the merits of this method of operating. It has, however, many theoretical points in its favor.

[We recall a case of Cæsarean section in which the patient could not be thoroughly prepared, in which stitch-hole abscess occurred from infection from the skin. In this instance the abscess extended to the uterine wall, but gradually closed. As some cases of Cæsarean section must always be emergency operations, the possibility of infection from the skin must not be overlooked.—ED.]

A Case of Tuberculosis of the Placenta.—In the *Scottish Medical and Surgical Journal*, 1897, vol. i., No. 2, KYNOCN reports the case of a pregnant woman who died of acute tuberculosis. On post-mortem examination a pregnancy of three months was found. Both Fallopian tubes were distended with caseous material, while the placenta was studded with gray tubercles. The ovaries were filled with semifluid caseous material in which tubercle bacilli were found. There was no obvious tubercular lesion in the fœtus.

The primary seat of the disease was in the Fallopian tube, thence it had spread upward to the ovaries, peritoneum, lungs, and liver, and also to the uterus and placenta.

The Advantages of Crede's Method for Preventing Ophthalmia.—In the *Archiv für Gynäkologie*, 1897, Band liv., Heft 1, SCHALLEHN urges the value of Crêde's method for the prevention of ophthalmia. Among 917 infants two had inflammation of the eyes. Both cases developed eight days after birth, and were not severe. Immediately after labor no case developed, and the cause for this immunity is said to be the routine employment of nitrate of silver instillations. In no case were any bad results observed, nor was any inflammation seen to follow the use of the silver nitrate.

Is Routine Uterine or Vaginal Syringing Necessary after Parturition?—HORROCKS (*The Practitioner*, 1897, No. 352) discusses this practical and important question.

He cites the experience of Guy's Hospital Lying-in Charity. The work is entirely out-patient practice, and attendants are urged to cleanse the hands

thoroughly with bichloride 1:1000. During three years' time 9097 confinements were attended in one of the lowest and poorest quarters in London, with septic mortality of $\frac{6}{1000}$ of 1 per cent. No syringing was employed in these cases. This is certainly an excellent test as to the value of this method. He reports two cases where infection occurred by the process of syringing. In one a dirty syringe, which had been used at a former confinement three years before, was the cause of the trouble. In the other case a person having erysipelas had helped to draw the water employed in the douching.

Carcinoma of the Uterus During Pregnancy.—In the *Zeitschrift für Geburtshilfe und Gynäkologie*, 1897, Band xxxvii., Heft 1, OLSHAUSEN gives the results of his experience in cancer of the uterus complicating pregnancy. In the matter of diagnosis he calls attention to the irregular bleeding which occurs in cancer, and which may obscure the diagnosis of pregnancy. The shape of the body of the uterus can usually be outlined, and this should make a diagnosis of pregnancy evident. In considering the treatment one must remember that carcinoma grows with frightful rapidity in the pregnant or puerperal patient. For this reason radical operation should be resorted to as soon as a diagnosis is made. As regards prognosis, cases are reported free from disease from eight to three years after operation.

Olshausen operated upon nine cases up to the end of 1895. One died six months after operation from an unknown cause. In four the disease returned at intervals varying from five months to three and one-half years. Four remain well from two and a half to seven and a half years after operation.

As regards treatment, four methods of operating are available. The first is the total extirpation of the pregnant uterus through the vagina. Second is the extirpation of the uterus through the vagina after the womb has been emptied. Third is the total extirpation of the pregnant uterus, which is cancerous, through the abdomen, and fourth is Cæsarean section, with or without extirpation of the uterus afterward. Olshausen concludes that, in the early months of pregnancy, the cancerous uterus should be removed through the vagina. Most writers think that it is impossible to operate in this manner after the fourth month. In one case, however, Olshausen operated successfully at the fifth month, and in another toward the end of the sixth. The results of this operation are good.

Olshausen reports four cases in which abortion was first produced, and afterward the uterus extirpated through the vagina. Each of these cases made a good recovery. He allowed from eight to ten days to elapse after the abortion before removing the uterus. He also reports four cases in which the uterus was extirpated through the vagina after spontaneous birth or abortion. These patients also did well.

As regards the amputation of the pregnant uterus through the abdomen, and the extirpation of the cervix afterward through the vagina, Olshausen is not in favor of that procedure. He considers the risk of infection greater, and the probability of return also greater.

In two cases Cæsarean section was performed. In one instance the mother died six months afterward of cancer, while in the other septic infection and death occurred five days after operation. In conclusion, Olshausen urges in

cases requiring Cæsarean section that the womb be closed by suture and then extirpated through the vagina.

The Toxicity of the Urine in the Last Month of Pregnancy.—Among the many interesting contributions to this intricate subject is the paper by STEWART, of Cincinnati, describing a series of experiments upon animals (*American Journal of Obstetrics*, August, 1897). His method consisted in selecting at random from patients in the last month of pregnancy urine which was carefully kept in sterile jars; it was concentrated by boiling, neutralized with sodium bicarbonate, and filtered. It was then injected into the abdomens of rabbits under careful antiseptic precautions. In most cases death followed the injection, preceded by clonic and tonic spasms. The coefficient of toxicity by this method was fixed at 24 c.c. to the pound of animal. A comparison was made with these experiments by taking urine from non-pregnant gouty women, and also from a young girl not pregnant, and, so far as known, perfectly sound. The same result followed the injections in these cases. Stewart is led to conclude that there is no especial toxicity in the urine of women in the last month of pregnancy.

[It would be interesting to compare these experiments with those made by injecting concentrated solutions of potassium salts in like manner. It is quite possible that the process of boiling developed irritating compounds not normally in the urine, capable of producing convulsions and death. There remains still further to be remembered that it is not the contents of the urine in the last months of pregnancy which produce eclampsia, but the toxic substances which are not eliminated, and therefore are not present in the urine, but remain stored up in the liver and circulated in the blood of the eclamptic patient. As has been recently shown, the same poison which produces eclampsia tends to cause thrombosis and embolism. Such follow the circulation in the blood of compounds formed by cell necrosis present in various disordered conditions. It is not the eliminated poisons of the body which cause eclampsia, and the source of the convulsions probably does not reach the urine at all. The examination of the urine is simply the reading of a gauge to determine the condition of the mechanism within the body. The urine is but an index of the patient's elimination.—ED.].

The Frequency of Contracted Pelvis.—In the *American Journal of Obstetrics*, August, 1897, DOBBIN gives the results of the measurement of 350 cases to determine the presence of pelvic abnormality. In 40 of these women the pelvis was contracted, a percentage of $11\frac{4}{5}\%$; of these the generally contracted and flat rachitic were equally common, being 35 per cent. of the whole number. Then came the simple flat and then the irregular form. A large number of negro women were among those measured, and among them rachitis is frequent. About one-third of these patients were delivered spontaneously, and half of them required instrumental delivery.

[We have measured all patients applying for hospital treatment for five years past. The number of measurements considerably exceeds that of Dobbin, and the results agree substantially with his. He urges very properly that only the routine measurement of all pregnant patients available before labor can determine the frequency of contracted pelvis.—ED.]

GYNECOLOGY.

UNDER THE CHARGE OF
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The Danger of Pregnancy after Ovariectomy.—LAROYENNE (*Revue internat. de méd. et de chirurgie*, No. 1, 1897) reports the following interesting case. An easy ovariectomy was performed in the case of a young multipara. She menstruated only once after the operation. During the second month of pregnancy she was suddenly seized with severe abdominal pains, accompanied with dyspnoea and vomiting. Five days later she was admitted to the hospital in a moribund condition, and died the following day. At the autopsy the peritoneal cavity was found to be filled with coagula. The hemorrhage had come from the stump, the ligature having slipped in consequence of traction due to the growing uterus.

Prevention of Impregnation by Division of the Tube.—KEHRER (*Centralblatt für Gynäkologie*, No. 31, 1897) insists upon the importance of preventing patients with certain chronic and wasting diseases from becoming pregnant. This may also be desirable in cases of extreme pelvic contraction. It would seem more rational under these conditions to render such women sterile than to resort to the inevitable alternative of artificial abortion after pregnancy has occurred. None of the ordinary preventives is absolutely certain, at least in the hands of the laity.

Since removal of the adnexa is followed by climacteric disturbances, the writer suggests that a woman may be rendered sterile by simply dividing and ligating the tubes, as is practised by some operators during the performance of Cæsarean section. From experiments on rabbits he found that this procedure was not followed by either hydro- or pyosalpinx, as might have been inferred. He accordingly applied this method to the human subject in the following case. A woman, aged twenty-seven years, had borne six children, two of whom died soon after birth, and the rest were either idiots or malformed. A seventh pregnancy was terminated artificially at the fourth month on account of the wretched condition of the mother, which had grown steadily worse after every labor. After mature consideration, and after the failure of the usual methods of preventing conception, it was decided to accomplish this result by surgical means. The usual anterior vaginal incision was made, as in vagino-fixation, the fundus uteri was drawn down into the wound, and each tube was ligated in two places near the isthmus, and divided between the ligatures, care being taken not to include the vessels. The uterus was sutured in a position of ante flexion. Convalescence was normal, and the succeeding menstruation appeared at the usual time.

The advantages claimed for this method are simplicity and the absence

of subsequent disturbances, especially atrophy of the genitals and the extinction of sexual desire. Should the adnexa be diseased, they are, of course, removed. The writer adds that this operation should only be performed as a last resort, at the request of the family physician, as well as of the husband and wife. In order to avoid subsequent complications, the written consent of the parties interested should be obtained. The criticism might be offered, he concludes naively, that total abstinence would accomplish the same result, but experience shows that it is practically impossible to maintain this restriction.

The Results of Ovariectomy for Malignant Tumors.—KRATZENSTEIN (*Zeitschrift für Geb. und Gyn.*, Band xxxvi., Heft 1) reports the results of operative interference at the Berlin clinic in one hundred cases of carcinoma and sarcoma of the ovary, both primary and secondary, between the years 1879 and 1892. 28 per cent. died, 11 per cent. from sepsis. Of the remaining seventy-two cases, thirty-four had a recurrence, all but two having terminated fatally. There was no recurrence in the cases of fibro-sarcoma, which the writer adduces as an argument against the malignant character of these neoplasms. In 36 per cent. the patients were well at periods ranging from five and one-half to fourteen and one-half years after operation.

These favorable results justify the removal of malignant and ovarian tumors, but in order to secure the best results the greatest care should be exercised to avoid inoculation of healthy tissue with cancerous or sarcomatous material during the operation, by making a free incision previous to puncturing the cyst, and separating adhesions with unusual gentleness in order to avoid tearing the neoplasm. Above all, the importance of an early diagnosis and operation must be emphasized.

Differential Diagnosis Between Appendicitis and Diseases of the Adnexa.—SONNENBURG (*Deutsche med. Wochenschrift*, No. 40, 1897) calls attention to the difficulty of diagnosis, especially in cases in which the appendix is of unusual length or the abscess is situated low down. The immobility of the latter is an important point, though the same peculiarity is noted in carcinoma of the ileo-cæcal region with exudate. In cancer, however, stenosis of the gut is apt to be present.

The writer believes that the relative frequency of appendicitis in the male has been exaggerated, since in his own experience 60 per cent. of males and 40 per cent. of females were affected. The comparative immunity of women from the more severe sloughing processes may be due to the fact that in this sex the appendix has an additional blood-supply through the appendiculo-ovarian ligament, a special fold of peritoneum connecting the process with the right ovary.

Appendicitis is more likely to be mistaken for inflammatory disease of the right ovary and tube than the reverse. The history of previous pelvic trouble, especially of the extension of gonorrhœal infection, is important. It is rare for inflammation of the tube to occur without previous disease of the uterus. The situation of the tumor at the right horn of the uterus and the absence of intestinal symptoms are important. The exudate surrounding diseased adnexa is readily felt per vaginam, being usually situated in

Douglas's pouch. Pain and tenderness are noted at a lower level in tubal and ovarian disease, the pain seldom being referred to the stomach and umbilical region, as at the outset of appendicitis, while there is less general disturbance. Tympanites is more marked in connection with the latter.

The Surgical Treatment of Diffuse Peritonitis of Pelvic Origin.—WINCKEL (*Centralblatt für Gynäkologie*, No. 38, 1897) believes that the surgical treatment of diffuse peritonitis originating in disease of the genital tract is capable of more extended application than formerly. It is probable that from 70 to 80 per cent. of cases of tubercular peritonitis are curable by abdominal section, although five years should elapse without recurrence before the cure can be called positive. Removal of the exudate, and improvement in the circulation and respiration are factors in effecting a cure; the degree in which this is influenced by the admission of air, light, and chemical agents is still problematical. It is doubtful whether irrigation of the peritoneal cavity is desirable; at least only sterilized water should be used for this purpose. Affected tubes and ovaries should be removed only when this can be done easily. Drainage is unnecessary. Vaginal section is not applicable to these cases.

In peritonitis of gonorrhœal origin the tubes should be extirpated, the ovaries resected, and the peritoneal cavity simply sponged out, not irrigated. Drainage is not necessary unless a pyosalpinx or secondary abscess has ruptured into the peritoneal cavity, when the vagina offers the best route.

In post-operative peritonitis the wound is partly reopened and the pus thoroughly evacuated without irrigation. Drainage is indispensable, through the wound, or per vaginam, if there is a collection in Douglas's pouch.

Surgical interference is indicated in diffuse puerperal peritonitis when the fact of suppuration can be established. About thirty cases have been reported, with a mortality of 80 per cent., as opposed to 73 per cent. with expectant treatment. Most of the recoveries were in cases of from one to two months' standing, acute cases being most unfavorable. A free abdominal incision should be made, with subsequent irrigation and drainage. The adnexa should be removed only if they form pus-foci. Vaginal hysterectomy is permissible in desperate cases alone.

Diffuse peritonitis due to rupture and suppuration of cysts, abscesses and ectopic sacs, and torsion of the pedicle is nearly always fatal without prompt interference. Drainage is to be employed only when pus-foci remain.

Cure of Gonorrhœal Affections of the Female Genital Organs.—MIHAJLOVITS (*Ibid.*) notes the frequency with which these are arrested spontaneously, though with damage to the adnexa, and resulting sterility. He reports the results of treatment in 140 successful cases. Solutions of nitrate of silver from 1 to 1000 to 1 to 3000 were poured into the vagina through a cylindrical speculum, the cervical canal being swabbed out with the same. In cases of gonorrhœal endometritis the uterine cavity was irrigated with the same solution.

New Operation for Cystocele.—MARSJ (*Ibid.*) describes the following operation: A longitudinal incision is carried through the mucous and submucous

layers of the anterior vaginal wall, from the anterior fornix to the lower end of the urethra. At each end of this incision a small transverse one is made on either side, and the two lateral flaps thus marked out are dissected off. Interrupted sutures of catgut are passed through the base of the right-hand flap, beneath the median raw surface, emerging at the base of the opposite flap. The flaps are then replaced over the first line of sutures, and their opposite edges are united by a continuous suture of catgut. The result is not only the removal of redundant tissue, but the formation of a new supporting column in the median line of the anterior vaginal wall.

Best Method of Extirpating the Cancerous Uterus.—GOUBAREFF (*Ibid.*), in a discussion before the International Medical Congress at Moscow, affirmed that the operation of the future for the removal of the cancerous uterus was the abdominal, since it allowed thorough removal of affected glands, such as was practised in amputation of the breast.

KÜSTNER believed that in early cases the vaginal route was preferable, the thorough use of the cautery being advisable to prevent primary wound-infection. Freund's operation undoubtedly permitted freer access to the diseased parametric tissues, but was more dangerous than vaginal hysterectomy. He preferred to close the vagina and to drain through the vaginal wound, since his mortality after suturing the peritoneum, and also after draining per vaginam, was 50 per cent.

OLSHAUSEN said that he had ceased to operate in cases in which the disease had extended beyond the uterus; for those who desired to do so, the abdominal route was undoubtedly the best. Contrary to the common belief, the prognosis as regards a radical cure was better in cases of carcinoma of the cervix than of the portio vaginalis, since in the former the disease could often be entirely removed, while in the latter the vagina was early involved. He uses catgut ligatures, fixes the stumps in the wound and closes the peritoneum.

The Modern Treatment of Fibroids.—LAWSON TAIT (*British Medical Journal*, March 27, 1897) reaffirms his former opinion that in the case of multiple fibro-myomata extirpation of the adnexa is the operation of choice, his mortality having been only 1 per cent. Out of 108 patients all but two were examined five years after operation. It is important to remove entirely both ovaries and tubes. He entirely rejects intra-peritoneal treatment of the stump, as well as removal of the entire uterus, practising only the extra-peritoneal method.

The Clinical Significance of Retroflexion of the Uterus.—WINTER (*Centralblatt für Gynäkologie*, No. 25, 1897) examined three hundred women from two to ten months after delivery, and found the uterus retrodisplaced in thirty-six, or 12 per cent. Eleven had no symptoms, while in the remaining twenty-five the symptoms were due to complications other than the displacement in all but four. Ninety others under treatment for retroversion were carefully observed with the view of determining how far their symptoms were due to this condition alone, with the result that in eighty-four other complications existed (pregnancy, menorrhagia, prolapsus, disease of the adnexa, and parametric tissues) which were the real causes of their sufferings.

The writer arrives at the conclusion that the symptoms usually ascribed to retroflexion—dysmenorrhœa, menorrhagia, sterility, and tendency to abortion—are more often due to complications than to the displacement itself.

THEILHABER (*Ibid.*), in discussing the same subject, criticised the common explanation of the reflex symptoms accompanying retroflexion, as follows: 1. Pressure of the displaced organ upon the bladder, rectum, and pelvic nerves is regarded as the cause of many of these symptoms; but this is disproved by the fact that the weight of the uterus is too slight to cause such a result, while the rectum and pelvic nerves are sufficiently protected from such pressure. 2. Venous congestion has been frequently described, due to supposed torsion or obstruction of the veins in the broad ligaments, but this is prevented by the free anastomoses which exist. Moreover, one never finds in examining such displaced uteri either varices or infarcts, such as would result from long-standing hyperæmia. 3. The so-called reflex neuralgiæ, paralyses, etc., formerly attributed to retroflexion are now generally regarded by neurologists as of purely hysterical or psychical origin. The writer also calls attention to the fact that after the retrodisplaced uterus has been held in a position of ante flexion the supposed reflex symptoms may persist for several months.

He concludes with the statement that in a large proportion of his own cases of retroflexion (as well as in upward of four hundred cases in Landau's clinic), permanent good results were obtained by symptomatic treatment.

Curettement in Incurable Carcinoma.—BERTON (*Inaugural Dis ; Centralblatt für Gyn.*, No. 43, 1897) reports the results of curettement and cauterization in 100 cases of incurable carcinoma of the uterus, treated in Winckel's clinic. In 60.8 per cent. of the cases a temporary improvement was observed as regarded the hemorrhage and foul discharge; but pain was relieved less often. In 32 cases a moderate rise of temperature followed the operation. One patient died of exhaustion after the curettement had been repeated three times.

Post-typhoid Suppuration in Ovarian Cyst.—PITHA (*Centralblatt für Gynäkologie*, No. 37, 1897) reports a case of ovariectomy for removal of a suppurating cyst, four months after the development of typhoid, being the third on record. Characteristic typhoid-bacilli were found in the cyst-contents. It was evident that the suppuration was a metastatic process due to migration of the bacilli through the wall of the cyst. Their persistence for so long a time showed their vitality, and the fact that they found in the cyst-fluid a favorable culture medium. Werth and Sudeck report cases in which pure cultures of the typhoid-bacilli were obtained eight months after recovery. The pyogenic action of these bacilli is also shown, though it is not certain that they were the direct cause of suppuration.

Vulvo-vaginitis in Children.—MARFAN (*Abeille Méd.*, No. 16, 1897) describes the complications of this inflammation, which may be threefold, viz.: 1. Inflammation of Bartholin's gland, phlegmonous vulvitis, and rectal blennorrhœa; and often urethritis, which may even become hemorrhagic. Metritis, salpingo-oöphoritis, and peritonitis may occur. All these are due to direct

extension of the inflammation. 2. Gonorrhœal ophthalmia, or infection by contact. 3. General infection, as gonorrhœal rheumatism, which may develop as early as the ninth day and involve one joint only, especially the knee, lasting about two weeks. It may be fatal in the newborn. Endocarditis and pleuritis are possibilities. The writer speaks highly of irrigation with permanganate of potash, 1 to 1000, or, if this fails, with sublimate, 1 to 10,000, resorcin 1 to 100, or nitrate of silver 1 to 3000. He also recommends the introduction of pencils containing iodoform and alum.

COMBY (*Gazette des Hôpitaux; Centralblatt für Gynäkologie*, No. 37, 1897) reports three cases of vaginal hemorrhage in young children, one of whom was only two years old, which had been diagnosed as metrorrhagia. Examination showed that the blood came from granulations around the meatus urinarius, while at the same time there was a profuse gonorrhœal discharge. The patients were promptly cured by irrigation with a weak permanganate solution and cauterization of the bleeding spots.

MEJIA (*Gaz. hebdom. de méd. et de Chirurgie*, No. 29, 1897) calls attention to the fact that in rare instances diffuse peritonitis may result from extension of a vulvo-vaginitis upward to the uterus and tubes. The prognosis is nearly always unfavorable. The diagnosis is difficult, but the condition may usually be inferred in a case of gonorrhœal vulvo-vaginitis in which violent diffuse peritonitis develops, appendicitis being excluded. Abdominal section offers the only prospect of saving the patient, and must be performed as early as possible.

Effect of Abdominal Section on Peritoneal Tuberculosis.—WESTPHAL (*Centralblatt für Gynäkologie*, 1897, No. 41), after making a series of clinical observations, decides that none of the theories advanced to account for the curative effect of celiotomy in peritoneal tuberculosis are entirely satisfactory. The removal of bacilli or of exudates, diminution of the intra-abdominal pressure with secondary hyperæmia, emptying of lymph channels—these play only a minor part in the healing process. It does not seem credible that diseased conditions which have existed for months or years could be favorably influenced by changes which are necessarily only transient. The writer believes that, aside from all these, the main factor is doubtless the free admission of the external air to the peritoneal cavity, which in some unexplained way, under favorable conditions, effects a cure.

Carcinomatous Degeneration of Uterine Fibroid.—RADEMACHEE (*Inaugural Dis.; Centralblatt für Gynäkologie*, 1897, No. 41) describes an interesting specimen, removed post mortem, which at first sight seemed to be one of true carcinomatous degeneration of a fibro-myoma. But, on closer study it was evident that the two fibroid tumors affected were really invaded by outgrowths from an adjacent malignant neoplasm of the corporeal endometrium. The mucosa covering one of the interstitial tumors was entirely replaced by cancerous tissue.

The writer affirms that all cases of so-called carcinomatous degeneration of uterine fibro-myomata are doubtless examples of secondary infiltration of cancer-cells from the diseased endometrium, as in the case cited.

PÆDIATRICS.

UNDER THE CHARGE OF

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ASSISTED BY

THOMPSON S. WESTCOTT, M.D.,

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Hysteria in Children.—STEINER (*Jahrbuch f. Kinderheilkunde*, 1897, Bd. xliv. S. 187), in an elaborate paper containing a most complete bibliography, records seven personal observations, one of which is sufficiently striking to be quoted.

The patient was a boy, aged five and a half years, whose symptoms were more or less those of tubercular meningitis. He had ptosis, strabismus, headache, slowing and irregularity of pulse, and facial paralysis. The absence of fever, vomiting, constipation, retraction of the head, together with the appearance of not being seriously ill, suggested the possibility of hysteria, the stigmata of which were found to be present. Other observations less typical are given, such as frequent vomiting independent of lesion of the gastro-intestinal canal (two cases in girls, aged ten and thirteen years); inability to swallow solid food after extraction of a foreign body from the œsophagus; visual hallucinations. All these children, who presented the stigmata of hysteria, were cured by psychotherapy.

Prophylaxis of Nephritis in Scarlatina.—ISIDORO PUJADOR Y FAUVA (*Twelfth International Congress, Moscow, Section of Pediatrics*) highly commended the use of oil of turpentine hypodermatically or by mouth in the treatment of scarlatina, and as a means of preventing renal complications. The plan was suggested by the success of Fochier, of Lyons, in treating puerperal streptococcic infection by hypodermic injections of turpentine. A case of complete anasarca from nephritis in the period of desquamation was cured rapidly, according to the reporter, by means of such injections without other treatment. More than 120 cases of scarlatina, in children and in adults, some of which were very grave, were treated by turpentine internally, and all were cured, albuminuria not being observed in any of the cases, though the patients were permitted to be in the open air in less than three weeks from the time of the attack.

A manifest diminution in the symptoms having been observed within three hours after the injection, and the turpentine having been detected by its violet-like odor in the urine, the author concludes that the drug acts immediately by absorption, changing the microbic metabolism by neutralizing toxins or increasing phagocytosis. This drug, employed internally from the beginning of the disease, has never been observed to produce albuminuria.

Beyond an irritant effect from the local use of turpentine (which may be

readily avoided by the addition of an alkali, like sodium bicarbonate) the drug is harmless to the organism if not used in doses greater than a gramme for young children, and not exceeding three grammes for adults, administered as a potion (emulsion) or in perles. It is necessary to watch the digestive apparatus and to suspend the drug for two days, replacing it by saline laxatives.

Thyroid Therapy in Idiopathic Tetany.—MAESTRO (*Riforma Medica*, 1896, vol. ii., Nos. 40, 41) reports that raw or dried thyroid, in dose of 2 to 4 gm. daily, is well borne, and has given him very good results in the treatment of the idiopathic tetany of infancy. Under its influence the attacks become less frequent, the duration of contraction is shortened, and complete cure results.

The Status of Lumbar Puncture.—This subject was thoroughly discussed in the Pædiatric Section of the recent International Medical Congress in Moscow.

VON RANKE (Munich), after a short historical sketch, referred to the harmlessness of the procedure, but as to its therapeutic value was forced to conclude that, in spite of all theoretical considerations, it must be confessed that the method offers nothing of value in the treatment of tuberculous meningitis. In more than 100 collected cases in which puncture had been made, not one had been saved. With reference to its diagnostic value, the speaker stated that in spite of the most careful search the bacillus had not been detected in the fluid from a number of cases which presented no difficulty in diagnosis as determined by their clinical symptoms and course. Its value in differential diagnosis he believed to be still *sub judice*.

MONTE (Vienna) reported that he had in the past two and a half years made the puncture in twenty-one cases—fifteen of basilar tuberculous meningitis, five of epidemic cerebro-spinal meningitis, and one of acute hydrocephalus following cerebro-spinal meningitis. He concludes that in basilar tuberculous meningitis the procedure offers only occasional help in diagnosis, and cannot invalidate the clinical diagnosis. Therapeutically, in tuberculous meningitis, lumbar puncture is without value. In acute cases of epidemic cerebro-spinal meningitis, examination of the fluid may help to establish the diagnosis; but after a week's duration of illness the result is usually negative. Repeated punctures in the acute stage of epidemic cerebro-spinal meningitis are not without benefit, and should lessen the mortality from this affection. Puncture of the fontanelle, with or without injection of iodine preparations in chronic hydrocephalus, has so far given no practical results.

RACZYNSKI (Cracow) subjected twenty-six cases of hydrocephalus to lumbar puncture. Twenty-one of these were cases of the congenital or acquired disease, in which the cause was unknown; the remaining five cases followed cerebro-spinal meningitis. Seventeen cases of the first group were still increasing in size, and in these, while temporary reduction in the measurement of the skull was observed for several days after puncture, the condition rapidly returned, and the skulls reached even greater dimensions. Not a single case was cured. The remaining four cases of the first group had reached an extreme stage of distention. In these the dropsy was relieved, but the

children could not walk. The reflexes remained exaggerated and the gait spastic.

In the second group of cases (consecutive to cerebro-spinal meningitis) the headache and feeling of distention were partially relieved.

A Chemical and Bacteriological Study of Hydrocephalic Fluid.—CONCERTI, of Rome (*Wiener klinische Wochenschrift*, 1897, No. 42, S. 934), finds that hydrocephalic fluid is sterile and faintly alkaline and of a specific gravity varying from 1005 to 1010, having no toxic action upon animals. The proportion of albumin remains constant (about 0.25 per cent.), despite repeated punctures. Glucose has never been found, nor has peptone, urea, mercury, or potassium iodide. Salts are present in small quantity. It therefore has the same chemical composition as physiological cerebro-spinal fluid, and consequently is not an exudate or transudate, but a true secretion.

The author has also studied, bacteriologically, the hydrocephalic fluid obtained in pathological conditions in which streptococci, staphylococci aurei et albi, pneumococci, and bacteria coli have been found. A series of observations has shown that their growth is checked, and that upon staphylococci an agglutinative effect is produced. The movements of the bacterium coli are rendered more sluggish. With inoculated animals he found that death occurred less quickly than in control-animals. At autopsy were found only slight superficial anatomico-pathological lesions, and often no changes at all were present.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Visceral Changes in Extensive Superficial Burns.—The association of lesions of the internal organs with extensive superficial burns has long been known, and numerous theories have been proposed to explain their occurrence. The most recent of these is the theory that the internal lesions are the expression of a reaction to some poisonous substance in the blood, and based upon this theory is the conception that death, in cases of extensive superficial burns, is the result of a toxæmia of some kind. Nevertheless, up to the present time, all efforts to obtain the toxins responsible for this condition from the blood have either wholly failed or have yielded inconclusive results.

In the hope of shedding some light upon this obscure subject, BARDEEN has carefully studied the lesions present in the internal organs from five cases of extensive burns afforded by the Pathological Laboratory of the Johns Hopkins Hospital (*Journal of Experimental Medicine*, ii., No. 5, p. 501). In the nature and distribution of the lesions, Bardeen finds confirmation of the toxæmia theory.

The material studied was from children from sixteen months to eight years of age, and in all the cases the burns had been very extensive and death had

occurred quickly—in from four to nine and a half hours after the injury. The lesions in the internal organs were strikingly alike in all.

The notes of the autopsies recorded the chief gross morbid changes as being cloudy swelling of the liver and kidney, softening and enlargement of the spleen, and, above all, swelling of the lymph nodes and of the gastrointestinal lymph nodules. Moderate hyperæmia of the thoracic and abdominal organs was also noted. Cultures for bacteria made at the autopsies were negative, except that in one case the micrococcus lanceolatus was obtained from the lungs. The autopsies were all made very soon after death.

The microscope confirmed the naked-eye appearances of parenchymatous degeneration in the liver and kidneys, and revealed in addition marked degenerative changes in the blood. These last were shown more particularly in poikilocytosis and extensive fragmentation of the red corpuscles. Leucocytosis was also observed, associated with evidences of great reproductive activity and foci of degeneration of the bone-marrow. Thrombi were common only in the superficial layers of the skin.

Special interest attaches to the changes in the lymph nodes. These were in all the cases, and everywhere in the body, of the same fundamental character, though varying somewhat in extent and intensity. They consisted essentially of œdema, swelling and fragmentation of the lymphocytes, and in places of distinct areas of necrosis. These lesions were focal in distribution and were most marked in the centre of the follicles of the nodes, or, in other words, in the immediate area of the blood-supply. Similar degenerative changes were also observed in the Malpighian bodies of the spleen.

This distribution of the lesions in the lymph nodes and their similarity to the changes in the nodes observed in many of the infectious fevers, in which bacterial toxins in the blood are believed to be the cause of the lesions, lead Bardeen to the conclusion that the remote lesions in cases of superficial burns are the result of the presence in the blood of toxic substances similar in their action to the bacterial poisons. In fact, similar lesions in the lymphatic structures have been produced experimentally by the intravenous injection of bacterial toxins. The source of the toxic substances in cases of burns is as yet unknown, but that they are of a high degree of toxicity is clear from the rapidity with which the lesions develop.

Serum Diagnosis of Cholera.—ACHARD and BENSAUDE, whose careful work in connection with Widal's test for typhoid fever is well known, report the results obtained by them in similar examinations of the blood from fourteen cases of cholera Asiatica.—*La Semaine Médicale*, 1897, 151.

The serum used for the tests was sent to them from Cairo and from Alexandria, as were also samples of the stools from some of the cases. Bacteriologic examination of these latter confirmed the diagnosis of cholera.

Thirteen of the sera caused very positive agglomeration of cholera bacilli—all in dilution of 1 to 10 or 15, the majority in dilution of 1 to 20, and one even in dilution of 1 to 120. Of these thirteen cases the serum was obtained twice on the first day of the disease, in three instances on the second day, in four cases on the third day, twice on the fourth day, once on the sixth, and once on the twenty-eighth day. The appearance of the reaction in the very early days of the disease is important as increasing its diagnostic value, and

is in contrast to the much later appearance of Widal's reaction in typhoid fever. It is not known whether prodromal symptoms were present in the case whose blood showed the reaction on the first day of the disease.

In the one case which failed to yield the reaction the blood was taken on the third day of the disease, and the patient died on the same day.

Control tests were made with thirty different sera, six from healthy persons and twenty-four from persons suffering from other diseases than cholera. Of these only two showed any agglomeration, and that but slight. Both of these patients were at the time suffering from uræmia. But, notwithstanding these more or less positive results, Achard and Bensaude maintain that no confusion should arise if the rule now generally followed in the serum diagnosis of typhoid fever, of accounting only such reactions as positive which are decided and speedy, be followed also in the case of cholera tests. Thus, in Achard and Bensaude's investigation, if no reaction had developed under the microscope in the course of an hour, the result was set down as negative. In most cases a positive reaction was evident in from five to twenty minutes when the serum was diluted not more than fifteen times. In tubes the reaction developed somewhat more slowly, but was usually evident in from one to two hours at a temperature of 37° C. Dried serum was found to retain its agglomerating power for five months, even when diluted ten times.

The reaction was not in any instance obtained from the stools, indicating that the agglomerating substance is not contained in the dejecta in any considerable quantity, if at all.

Finally, the reaction was tested with cholera cultures from nine different sources, and all were found to be similarly affected. *Vibrio-Massauah*, *Vibrio-Metschnikovi*, and the Finkler-Prior spirillum developed no reaction.

As regards the technique of the test, it is recommended that germs from agar cultures be employed in preference to bouillon cultures, because of the frequent tendency of cholera bacilli to grow in colonies in broth. To avoid any confusion of such colonies with agglomerated clusters, Achard and Bensaude made use of thoroughly mixed suspensions in normal salt solution of the germs from agar cultures.

While the results of their investigation are regarded by Achard and Bensaude as of much suggestive interest, they are not put forward as conclusively indicative of the value of the test in the diagnosis of cholera, because of their comparatively limited number.

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CONGENITAL DISLOCATION OF THE SHOULDER-JOINT.

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IN the *Archives of Pediatrics*, for April, 1890, I described two cases of congenital dislocation of the shoulder-joint, occurring in children of the same family.

IN medical literature, so far as I have been able to find, little has appeared to make the pathology of this deformity clear. Küster¹ operated in 1882; Phelps² operated once in April, 1895; F. S. Eve³ operated in August, 1895; Phelps operated twice in November, 1895. Dr. James S. Stone, of Boston, permits me to make mention of an unpublished case of his in this connection. He operated a few months ago, in 1896, upon a child, eight months old, with a traumatic subspinous dislocation of the shoulder. No bony deformity was found. It was impossible to replace the humeral head completely. Slight improvement resulted after the operation. This case will be reported in full later by Dr. Stone. These are all the cases operated upon up to date and reported in literature.

Küster's case died; Phelps's first case proved to be a traumatic dislocation; Eve's case was also probably traumatic—there are no good notes of the operation. Phelps's other two cases are yet to be heard from. R. W. Smith's⁴ original description in the *Dublin Medical Journal* still remains the only report of the pathological conditions existing in congenital dislocation of the shoulder-joint.

¹ Küster: *Ein Chirurg*. Wiennium, 1882, p. 256. Also *Berlin klin. Wochenschrift*, No. 1, p. 9.

² Phelps: *Transactions of the American Orthopedic Association*, 1895.

³ Eve: *Clinical Society Transactions*, xxvii. p. 229. Roberts, J. R., *Transactions American Surgical Association*, 1895, xiii. p. 385, describes a subspinous case. It was not operated.

⁴ Smith: *Dublin Medical Journal*, 1839, xv. p. 281.

I have seen in my clinic during the past winter, two patients: one a true congenital dislocation of the shoulder-joint, the other a traumatic dislocation of the shoulder-joint, occurring probably at birth. A description of these two cases follows:

CASE I.—*H.*, a girl, aged one year and three months. The labor was very hard; the child was born without instruments, and was a head presentation. It was noticed during the first week of life that the baby's right arm and hand were somewhat swollen. An examination finds that the child holds the right arm rotated inward. The right internal condyle looks backward; the head of the humerus is felt in the infra-

FIG. 1.



CASE I.—Traumatic subspinous dislocation of right shoulder at birth. Note apparent shortening of right humerus and position of right upper extremity.

spinatus fossa. The bones of the upper extremity, including the clavicle, scapula, humerus, radius, and ulna, are of normal size and development. There is no atrophy or lack of development of the muscles of the right upper extremity, and the electrical examination shows no muscular changes. The movements at the shoulder are nearly normal, being limited somewhat in abduction and rotation outward. (Fig. 1.)

CASE II.—*S.* is a girl, about three years old. The child was a head presentation, and was born without instruments. The labor was not hard. At no time was there noticed to have been any injury to the right upper extremity. The position of the right upper extremity is seen in the photograph. The right elbow is held away from the side, the forearm and the humerus are both slightly flexed; the forearm is partly pronated. The humerus is rotated inward, so that the internal condyle looks backward. The head of the humerus is felt under the outer third of the spine of the scapula, a little behind the

aeromion proecess. The voluntary movements are limited. The glenoid cavity cannot be felt. The scapula is small. If the upper extremity is rotated outward, the head of the humerus can be seen to disappear from the dorsum of the scapula and can be felt to move forward near to the normal position of the glenoid cavity. The moment rotation ceases the head of the bone returns to its former position under the spine of the scapula. While the head of the bone is near to the normal position, if an attempt is made to bring the arm to the side of the body, a movement of the scapula takes place, the humerus being locked with the scapula. (Figs. 2 and 3.)

FIG. 2.



CASE II.—Probable true congenital dislocation or misplacement of right shoulder-joint. Note shortening of right arm and position of right upper extremity.

The description of the attitude in this case might well be that of the first case, so closely do they resemble each other. In the second case, upon careful measurement of the bones of the upper extremity, the following facts are observed :

Length of right clavicle	. . . . .	2 $\frac{3}{4}$ inches.
Length of left clavicle	. . . . .	3 $\frac{1}{2}$ "
From aeromion to external condyle of right humerus		5 $\frac{1}{2}$ "
From aeromion to external condyle of left humerus		5 $\frac{1}{2}$ "
Length of right radius	. . . . .	5 "
Length of left radius	. . . . .	5 $\frac{1}{2}$ "
Length of right ulna	. . . . .	4 $\frac{1}{2}$ "
Length of left ulna	. . . . .	5 $\frac{1}{2}$ "

At the level of the plane passing three-fourths of an inch above the nipple in front and through the fifth dorsal spine behind, the right chest measures ten inches and the left chest measures ten and a quarter inches. The scapula on the right side is much smaller than the scapula on the left side.

In comparing these two cases, it will be seen that in the first instance traumatism probably played an important part, as evidenced by the

swelling of the arm and the difficult labor. Such traumatic dislocations are apparently not very uncommon.

FIG. 3.



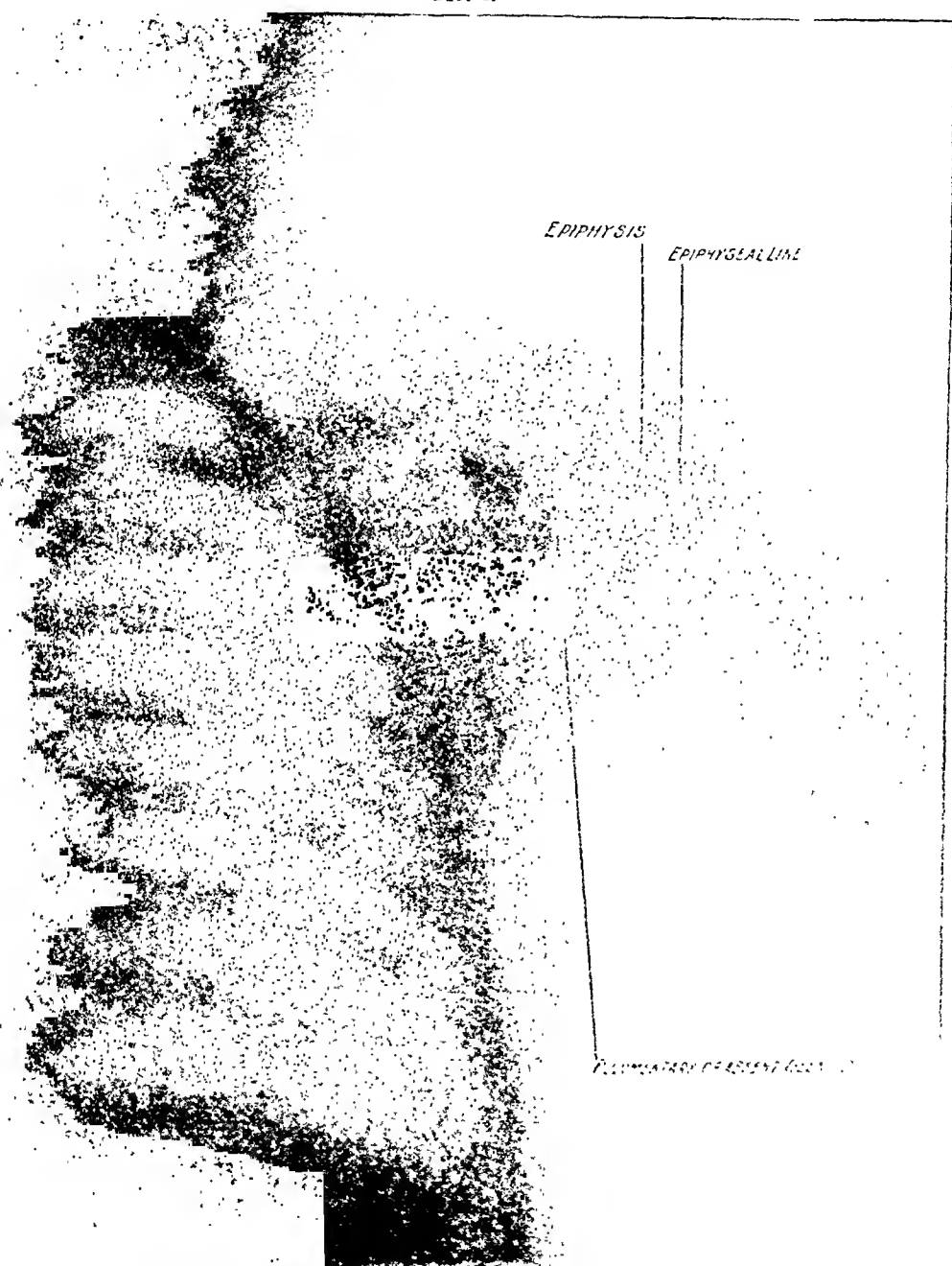
CASE II.—Congenital dislocation of right shoulder. Note small right scapula; position of right upper extremity. (3) Head of bone in abnormal position.

In the second case the facts that the labor was easy and that instruments were not used, that no disturbance of the arm was noticed during the first week or two after birth, that the child at no time carried the arm in a helpless fashion but always used it, and that there is a lack of development of all the bones of the upper extremity, seem to me to point conclusively to a congenital deformity.

The x-ray picture of this second case shows a decided difference in the bones of the two shoulder-joints. The proper interpretation of the conditions seen in the skiagraph is extremely difficult, but that the right

side differs materially in size and in outline of the bones forming the shoulder-joint is evident. The absence of bone about the region of the

FIG. 4.



X-ray plate of Case II. Congenital dislocation of the right shoulder-joint

glenoid is very noticeable. The small size of the humeral epiphyses is evident. (Figs. 4 and 5.)

I have found no record of accurate measurements made in other cases

of so-called congenital dislocation of the shoulder-joint; but it seems highly probable that the distinguishing feature between the purely trau-

FIG. 5.



X-ray plate of Case II. Normal left shoulder-joint.

matic dislocation of the shoulder happening at birth, and the true congenital dislocation of the shoulder is that in the true congenital dislocations there is always present a lack of development of the bones of the

upper extremity. In the two cases reported in 1890, no operation would be allowed. In the cases reported to-day, it is probable that an operation will be permitted.

From the analogy of congenital dislocations of the hip-joint, it would seem that this shoulder deformity is probably due to a lack of development of the glenoid cavity and the head of the humerus; these x-ray plates support this view, that in the normal position for the glenoid cavity there is a rudimentary glenoid, and that the glenoid cavity occupied by the rudimentary head of the humerus is developed in an abnormal position, so that, as was suggested in the report of the original two cases, the term "congenital misplacement" of the shoulder-joint would be a better term than congenital dislocation.

The operative treatment of true congenital misplacement of the shoulder-joint cannot be formulated until the conditions existing are seen and handled in any particular case.

189 BEACON ST., BOSTON, MASS.

THE DANGERS OF TUBERCULAR INFECTION AND THEIR PARTIAL ARREST BY CLIMATIC INFLUENCES.¹

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IN reviewing the evidence of partial arrest of tubercular infection by climatic influence, all data of a general character have to be taken with great caution. The impression that in the arid or elevated regions of the world, consumption from being so rarely seen is not communicated from the sick to the well, is not at all proved from such imperfect and unreliable statistics as have generally been brought forward. The immunizing power apparently possessed by a climate may be really due to manner of life, such as isolation; and a life, day and night, in the open air; or selected lives, such as the early settlers of any country live, who, to cope with its hardships, have of necessity to be the strongest.

It is, therefore, only after a country has been settled some little time that indoor industries, over-crowding, and the general unsanitary environment of civilization exert their full action, that any reliable data concerning climatic arrest of infection can with real accuracy be computed, since no experiment is accurate unless conditions are equal or nearly so. Conditions are now, however, favorable for comparison, as the dry and elevated regions of almost the entire world have populous cities, whose inhabitants lead indoor lives, and whose environment closely approaches

¹ Read at Congress of American Physicians and Surgeons, Washington, D. C., May, 1897.

that of the dwellers in the dense civilized centres from which our statistics have for years back been taken; so that at the present day, comparative statistics of tuberculosis, collected with care, show the relation between a seaboard town and one at an elevation of six thousand feet, with a degree of accuracy and truth that leaves very little to be desired in a collection of scientific data.

I shall not burden you with a long list of dry details regarding the immunity conferred by different climates in cases of pulmonary tuberculosis. It has been found, as you no doubt are aware, that in certain elevations above the sea consumption has occurred very infrequently. On the high table-lands of India,¹ of Africa,² of the valleys of the Andes,³ in some parts of Switzerland,⁴ etc., consumption seems to be a rare disease, even when the population at this elevation (from three thousand feet upward) is an industrial one; and, when, as in South America and other places,⁵ the natives are crowded together, favoring contagion, and have food not adapted to proper nutrition; still the rate from tuberculosis is very small as compared to the rate of deaths from this disease among the same people living at a lower altitude, although other conditions except the factor of elevation are the same. It is a law well established that consumption among all races and in all climates diminishes in a progressive ratio as we ascend from the sea-level. There are, however, exceptions to this law, but they are more apparent than real. As, for instance, in Iceland consumption is a very rare disease, as in the Hebrides and Faroe Islands,⁶ also among the inhabitants of the Russian Steppes.⁷ Parts of Algeria also have a singular immunity; but it is well to remark that, to a great degree, the immunity ceases to be observed when the inhabitants of the countries are brought into contact with consumption, as in the Sandwich Islands, where it was not known until the advent of the white man;⁸ or when these natives change their mode of life, as to industrial indoor occupations from agricultural outdoor ones. These factors act quite as readily in trading stations in North Greenland as on the borders of the Soudan.

Elevation is the only climatic environment which seems to confer any marked immunity, as I shall show from the history of cities situated much as those in Colorado, where, notwithstanding overcrowding, indoor occupation, contact with tuberculosis in every form, the increase of the death-rate from non-imported consumption remains insignificant. Undoubtedly this is the effect of the high altitude.

There is, however, no absolute safety, no non-phthisical line to be drawn at a certain elevation. A few cases do occur at any elevation.

¹ Evans: Phthisiology, p. 55.

² Ibid., pp. 63-232.

³ Ibid., quoting Gross, p. 233.

⁴ Ibid., p. 47.

⁵ Ibid., pp. 58 and 60.

⁶ Ibid., quoting Müller's report, pp. 15-237.

⁷ Ibid., quoting Schleisner, p. 46.

⁸ Evans, p. 57.

I, myself, have seen three deaths from acute tuberculosis in renegade Ute Indians, who had never been out of Colorado or Utah, or been lower than six thousand feet; who had never lived in a house, and who did not use beef or milk for food; who assured me that they had never seen or been near a white man or Indian with a cough. I also saw, some months ago, a white man, an American silver miner, who had lived in the hills of Colorado for twelve years, at an altitude of never less than eight thousand feet, far from any town or any one ill in any way, and whose food, air, exercise, family history, etc., were ideally perfect from a health stand-point; yet this man had lost some forty pounds in weight in four months and presented a typical case of phthisis in the second stage, with bacilli in sputa. So that no absolute immunity does exist from consumption in mankind due to altitude and its effects. Cases do occur, as I have shown, even under the best conditions and at a very high altitude.

The fact, however, that its occurrence is so infrequent and that as we ascend higher and higher from the sea-level the cases are more infrequent, when other conditions remain the same, points to some definite climatic power at work which renders mankind less susceptible to invasion of tuberculosis at certain elevations.

It has been to determine, if possible, what this protective influence is that I have been for the last few years engaged in investigation. I live in a city well adapted climatically to the purpose. Colorado Springs is at an altitude of six thousand feet. It has fourteen inches of annual rainfall, and, as you know, lies in our great so-called "dry plateau," the peculiar advantage being that it is well within the limited non-phthisical belt and has a population which has been engaged in indoor occupation for years, as in any Eastern city, besides having a large percentage of people infected with tuberculosis scattered among those who are well. For some twenty years consumptives have been coming to Colorado Springs, and the permanent population has been brought into close contact with them; so that, theoretically considered and from the stand-point of contagion, the population of Colorado Springs has been more exposed to the danger of infection from tubercular dust than the average city, and therefore should show at least a very large percentage of non-imported cases of consumption every year, or the climatic influence must arrest contagion, if other things are equal.

To determine the climatic effect, if any, upon germ life, I first considered the air, or, rather, the dust contained in the air and the germ life carried by this dust. The non-pathogenic micro-organisms were first taken up. The first experiment was to expose a Petri dish averaging about three square inches in area, the bottom covered with a thin layer of nutrient gelatin. After having been properly sterilized, these dishes or plates and gelatin are placed for a definite time in a certain place.

and the germs and spores of moulds gradually settle upon the surface of the gelatin. This gelatin, covered and put away, develops a colony where each germ has fallen; and by counting the colonies one can tell how many germs or moulds have fallen during the time of exposure. These exposures were made for two years during every month of the year, and every hour during the twenty-four, both indoors and out. The comparative number of germs can best be shown by comparative tables. The germs I now speak of are not, be it understood, the germs of disease, but the comparatively harmless ones common to all large cities and countries. At the same time their number in a given space of air is a standard of its purity; and, to a certain degree, the number of harmless germs is more or less of an indication of the number of harmful ones, such as consumptive germs, scattered among them.

I find that from one part of Colorado Springs, compared with a like place in New York City, as nearly as any comparison could be made, the following (taking as a standard of comparison the analysis of Dr. T. M. Prudden, of the College of Physicians and Surgeons,¹ New York City):

New York.	Colorado Springs.
Central Park, 499.	Pike's Peak Ave. (near Tejon), 89.
Union Square, 214.	Alamo Square, 23.
Private houses, 34.	Private houses, 39.
Dry-goods store, 199.	Dry-goods store, 99.
Street being cleaned, 5810.	Tejon and Huerfano Streets (a strong wind blowing, and dust), 753.

We see, therefore, from this that, although our air is not at all free from dust and germs, it still has only a moderate number, and these only in city limits.

As the plate method, however, is subject to error, I supplemented it by Miquel's method, which is to draw a given quantity of air through a tube filled with granulated sugar or sand of a certain sized grain. This sugar or sand acts as a filter, and when the air is drawn through it by an air-pump, all germs contained in the air are entangled in the sugar. This sugar is then dissolved in gelatin and the gelatin is put away. By counting the number of colonies developed in the gelatin, we know how many germs were in the air drawn through the sugar in the tube. I found by this more elaborate method practically the same result that I had obtained by the plate analysis. I made, in all, several hundred experiments. A careful record was kept of all meteorological conditions, such as temperature, wind, sunshine, character of ground, height from ground, visible dust present in the air, etc. It was found that, as is usual in all cities of all climates, the germs increased in a

¹ Dust and its Dangers, p. 26.

regular ratio as the dense centre of population was reached and more dust was raised in the air by traffic. The actual tables would be too lengthy for this paper, but the main fact was established that the air of the prairies was absolutely germless. I applied the most crucial tests to determine this point, taking as much as ten metres of air at one test; and extending my observations from twenty miles out on the prairies up into the foot-hills at least to an altitude of ten thousand feet, deep down in some of the cañons, in dense timber, and again on exposed rocky ridges. The result was always the same, provided I had used the utmost care against accidental contamination. The air of the prairies and mountains I found absolutely sterile and germless; when, however, I approached any ranch with buildings, or came near barns, houses, etc., as on the outskirts of towns, I invariably found more or less germ life.

The comparative tables are as follows:

Dr. Prudden, New York, average of germs in lecture-room in 10 litres of air:¹

Bacteria, 11; moulds, 14.

Colorado Springs Opera House (just after performance):

Bacteria, 15; moulds, 10.

Dr. Connelly, in Dundee (Scotland) Hospital, in 10 litres of air:²

Bacteria, 10 to 20.

Dr. Tucker, Boston, in hospital, in 10 litres of air:³

Bacteria, 20; moulds, 12.

Dr. Prudden, in New York, in various hospitals, in 10 litres of air:

Bacteria, 127; moulds, 25.

Colorado Springs, in various sanitariums and hospitals, in 10 litres of air: an average of about 25 to 50 bacteria and 11 moulds. In private houses, an average of 12 bacteria and 4 moulds.

Dr. Frankland, in open space in London, found in 10 litres of air, 35 bacteria; on roof of South Kensington Museum, 279 fell on one square foot in one minute; in Hyde Park, 24 bacteria in 10 litres of air.

From the above comparison it can be seen that in the dry elevated climate of Colorado Springs the ordinary number of non-pathogenic micro-organisms are present indoors or on the streets of the city. The dryness of the air probably assists their distribution by means of dust more effectually than in a more humid climate, but the general result is the same. The only point, therefore, bearing on the practical distribution of germ life ascertained by my experiments was the unusual and absolutely sterile condition of all the air not in the immediate vicinity of human habitations. This is a most important fact. Miquel has however, found the same absence of all germ life in Europe at an elevation of from two thousand to four thousand metres above the sea-level, while in the Rue de Rivoli, Paris, he found fifty-five thousand bacteria in ten cubic metres.

¹ Ibid., p. 31.

² Ibid., p. 33.

³ Ibid., p. 31.

I conclude, therefore, that there is very little proof that the actual number or kind of micro-organisms found in the air of a city at six thousand feet altitude has any relation to the non-development of tuberculosis; as, although the air generally is absolutely pure in our arid regions in the United States above four to six thousand feet, it is also a fact that in cities or towns at this elevation the air carries in its dust the ordinary number of bacteria and moulds that are found in cities or towns of the same population at a lower altitude, as at the sea-level.

These experiments on ordinary bacteria in the atmosphere in Colorado Springs and near by were extended so as to include a study of the separate bacteria present. Cultures were made on potatoes, agar, and other media, and the life-history of several micro-organisms not recognized from any description obtainable was made.

The result seemed to show that the climatic influence upon the development of non-pathogenic bacteria on ordinary nutrient media was negative; that dust taken from the atmosphere, out of doors or in, carried with it the usual number of ordinary bacteria and moulds that are found under similar conditions at lower altitude, combined with greater humidity; while the air obtained at a distance from buildings or roads was absolutely sterile.

The next point taken up was the effect of sunlight, combined with a minimum humidity, upon the vitality of tubercular bacilli in sputa.

It seemed reasonable to suppose that sputum, although it would become dry more rapidly in a dry air, and so prove a source of danger with less delay than under more humid conditions of the atmosphere, might also more rapidly lose its virulence exposed to a climate where the hours of sunshine are considerably in excess of those of most climates, and the diathermance of the air, or its thinness, contributing to the power of the sun's rays, acts as a germicide.

First having established the fact that fresh tubercular sputa injected into rabbits (either into the vein of the ear or the lower abdomen) produced a general tuberculosis within twenty or thirty days, quite as has been found under all climatic conditions, I selected the sputum which I had found contained tubercular bacilli, and from a patient, if possible, whose sputum had proved to be virulent at some previous time. This sputum was exposed to the direct rays of the sun for varying periods, and at different situations, with a background of sand, stone, or wood. After the exposure to the sun the sputum was rubbed up with sterilized water and inoculated into the thigh of a guinea-pig.

The animal was killed in from thirty to forty days after the time of inoculation. Some thirteen guinea-pigs were inoculated with 0.3 c.c. of sputa and water. The sputum was exposed to direct sunlight for from one hour and three-quarters to twelve hours. It was found that it took more time to dry the sputa in any quantity than was anticipated, and

that, even when dried, the mass was so firm that the current of air from a blow-pipe failed to detach even minute quantities; so that, without in some way grinding up the sputa, when dried, as is done by wheels or soles of shoes, it really could not be said to be dangerous and capable of infection. The result, however, seemed to show that sputum so dried in the sun at six thousand feet altitude was quite as capable of giving local or general tuberculosis as elsewhere,¹ at least, taken as I took it, from a mass of at least two drachms, and not distributed in dust as it is inhaled. The tables show clearly the details and technique of my work, but show nothing more significant than I have stated regarding the effect of sunlight upon tubercular sputa.

The infectiousness of dust, such as exists in rooms occupied by tubercular patients, was now investigated. In each case at least a quarter to half a square yard of dust was taken by means of cotton swabs from backs of pictures and dark corners, and was suspended in sterile water; it was then inoculated into the thigh of a guinea-pig, 2 c.c. being used at each injection. As the largest hotel in Colorado Springs is more or less filled with invalids suffering from consumption, and as tourists and others in good health also frequently pass some time there in rooms that have been occupied, it was deemed of importance to determine, if possible, the infectiousness of dust from its rooms and halls. Eight guinea-pigs, therefore, were inoculated with dust taken from the walls of the hotel and walls of rooms occupied for several years. Of these eight guinea-pigs none developed any tubercular lesion, local or general. Two pigs died, respectively, on the ninth and tenth day after inoculation, and might have developed tuberculosis; but, as all their organs and glands were perfectly healthy, and showed no evidence after careful search for tuberculosis, it is doubtful.

These guinea-pigs were freshly imported from Ohio, and were inoculated within seven days of arrival in Colorado, allowing no time for them to become acclimated; and in this sense they represented travellers or tourists and not natives, whose immunity might possibly be due to prolonged residence at an altitude. The animals were kept in separate cages in a room twelve feet by six, where only a limited amount of sunshine ever penetrated, and the air space was also insufficient to make the experiment as severe as possible. In fact, my loss from this cause was a serious drawback to my work, and the pigs lost on the average one-half ounce in weight in forty days. The animals were killed after the thirty-seventh day, this being the time deemed sufficient for infection, as it had been found that animals inoculated with dried tubercular sputa and dust showed clear evidence of general tuberculosis, as a rule,

¹ Delepine and Ransome: Report on the Disinfection of Tubercular Infected Houses. *British Medical Journal*, February 10, 1895.

earlier than reports from experiments of like nature at a lower altitude indicated.

The non-infection of the dust was, no doubt, partially due to the general cleanliness observed, as after a room is vacated it is most carefully cleansed, fumigated, carpets taken up, etc. At the same time, the personal habits of the occupant suffering from pulmonary tuberculosis, in regard to his disposal of sputa expectorated, was in no way controlled, and was often, doubtless, careless in the extreme; and under the conditions present (judging from similar experiments made at lower altitudes) some of the guinea-pigs should have developed tuberculosis. Hence, to be sure, only lost five guinea-pigs out of eighty-one inoculated from dust taken from buildings of the Adirondack Cottage Sanitarium.¹ But in these buildings efforts are directed with great care toward a prompt disinfection of all sputa, a condition unknown in the occupied rooms examined by me, whose occupants were under no restrictions as to the care of the expectorated matter, ventilation, etc.

I also obtained dust from walls of rooms in a sanitarium filled with consumptive patients. Three of the rooms were occupied at the time by patients in the third stage of phthisis, who had to use cloths to receive their sputa. Dust was also taken from the general sitting-room, occupied by several patients all day. Four guinea-pigs were inoculated. One died on the twentieth day; no evidence of tuberculosis was found. The others were killed on the thirty-seventh day, and were free from disease. This result was only to be expected, as the very greatest care is exercised in this institution to insure a safe disposal of all tubercular sputa. Sanitary cuspidors are used and burned, and strict rules against expectorating anywhere else are rigorously enforced, except in the case of those bedridden, who use cheese-cloth, as mentioned.

The next experiment was to determine, if possible, how readily a guinea-pig could be infected through the air alone by dried sputa. Four guinea-pigs were confined in a cage, the sunlight, air-space, and ventilation of which resembled, in proportion to the weight, as nearly as possible, a room or rooms occupied by a consumptive patient in the city. Cheese-cloth rags were then washed in tubercular sputa of a known virulence and hung about, so as to infect the air when dried, although not to come actually in contact with the animals. Unfortunately, these guinea-pigs all died, from some unknown cause, too soon to make this test of value, and I shall repeat it.

In these experiments I have, it is true, been obliged to confine myself to so few animals as to preclude the possibility of any percentages being made, but it is only fair to state that the technique was conducted with

¹ A Study of the Infectiousness of the Dust in the Adirondack Cottage Sanitarium. *Medical Record*, 1896.

great care, and in the case of dust taken from the hotel and sanitarium twelve guinea-pigs inoculated showed no trace of tubercular or septic infection. The control animals inoculated with sputa or with sputa and dust, with hardly an exception, developed local or general tuberculosis. I did not reinoculate any nutrient media to determine whether the lesions were produced by dead tubercular bacilli, but all nodules were examined microscopically, and the evidence of actual tuberculosis was most convincing.

This opinion is not entirely based upon the report given. Some two years ago I inoculated in all fifty-eight rabbits with dust from twelve private houses, three hotels, two hospitals, and some public buildings, using as control experiments pure culture mixed with dust. I was so unfortunate as to lose practically the result of this work, as the brass tags on the rabbits were all changed by my assistant; also some rabbits were eaten by dogs, and some escaped. But enough data of a general character were obtained to prove at least the rarity of tubercular infection from any dust collected in houses, hospitals, etc., in Colorado Springs; also the infrequency of acute septic infection after inoculating with such dust—a fact I had seen strikingly illustrated in a surgical practice of some five years, in what was then the frontier of Colorado, far from any aseptic aids.

In taking dust from a general hospital in Colorado Springs, where there were many surgical cases in public wards, I did not lose 2 per cent. of my rabbits from septic infection. Cornot lost fifty-four guinea-pigs out of ninety-four by acute infection from dust from hospitals. Hance lost 55½ per cent. of them from acute infection after they were inoculated with dust from tubercular wards of a hospital in New York; and he points out the significant facts that mixed infection is so serious that a simple tuberculosis can be changed to a mixed infection in an atmosphere laden with infective germs, and that out of 543 guinea-pigs inoculated with dust 316 guinea-pigs, or 58 per cent., died of some septic disease developed by germs contained in the dust. In my experiments, out of fifty-eight rabbits inoculated with dust from hospitals and like places where ill people were collected, I lost but two animals from acute septic infection. Rabbits are probably less likely to develop infection than guinea-pigs; but of twelve guinea-pigs inoculated with dust from hotels and sanitariums none died of septic infection.

The question was brought very forcibly to my mind, from the results of my work in this direction, as to whether we do not owe much of the improvement in tubercular cases in Colorado to the absence of the septic germs in the atmosphere, indoor as well as out, quite apart from any climatic effect upon the tubercular germ pure and simple. This, of course, could only be determined absolutely by a much more extended series of experiments than I have taken. The important point, after all,

and the most practical one, is how dangerous is it to live in Colorado Springs among consumptives? Are there any data to show the actual presence of cases that date their tubercular invasion to, in some way, contracting the disease by living in proximity to consumptives, as most well people do in Colorado Springs? In 1892 I published in *THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES* all cases of non-imported consumption that I could find. At that time I personally interviewed every physician in Colorado Springs, and wrote to many who had lived there, besides obtaining testimony from each and every one I could in regard to the origin of consumption in the city. After two years I found and published a list, with their histories, of ten cases that had occurred in Colorado Springs during fifteen years.

Since that time, or from 1892 to April of this year, I have been collecting statistics. A circular letter was sent to every reputable physician practising in Colorado Springs, asking for a list of his cases of non-imported phthisis, seen or heard of, during his practice, and the number of years he has practised in the city. The number of years' practice represented was one hundred and forty-four and a half. Twenty cases were reported, including the ten reported by me in 1892. At any average city at the sea-level the rate of three deaths per thousand is acknowledged to be the average. At the same ratio, a city like Colorado Springs would have had in twenty years, with its constantly increasing population, from one thousand up to twenty thousand, a total rate of six hundred and thirty deaths, while it had in twenty years ten deaths (as not all the cases reported died). In 1896¹ but one case was reported to the city physician. The average town at a lower altitude, with twenty thousand inhabitants, would show sixty deaths from tuberculosis, presumably contracted there in one year.

The objection that in Colorado Springs statistics, based on a constantly changing population, are inaccurate, does not hold. Colorado Springs, unlike most health resorts, has a permanent population. People who live there make the place their home, winter and summer, and have done so for years; many of them are engaged in indoor occupations and business life generally, quite as in any city, the proportion of tubercular to non-tubercular inhabitants being one invalid to every six people. Many of the inhabitants are predisposed to contagion by family history, having come to Colorado on account of consumption in some member of their family. The tubercular and non-tubercular mingle together in a most promiscuous manner; yet, in spite of these conditions, which have gone on for years, the actual rate of death from non-imported tuberculosis is so far below the rate in any average city in the United States as to make Colorado Springs, as a matter of fact, probably the least dan-

¹ Colorado Springs Health Department, Dr. B. H. Grover, Health Officer, 1895-96.

gerous place to live in, judged from the non-imported tubercular death-rate, about which we have any information.

Of the cases of non-imported consumption that did occur in Colorado Springs, one only could be traced clearly to infection. In this case, a robust man in the prime of life, who had lived in Colorado for eighteen years, occupied a tent with a man ill of consumption. This patient expectorated very frequently on the dusty floor of the tent, and the result was a very clear case of infection, as his companion, inside of four months, developed a cough and pulmonary hemorrhages, with bacilli in sputa, although an unusually strong and athletic man. His subsequent history was a decided improvement in El Paso, Texas, to which place I ordered him. There was a gain of forty-two pounds in weight, but then he began to lose weight, much as he did in Colorado; and on his return to Colorado he died of tubercular laryngitis.

In all other cases there was no direct evidence of infection, but, on the contrary, those developing consumption, as far as could be observed, were far less exposed to infection than even the average inhabitant of Colorado Springs; and some of the cases lived far from any consumption or possible source of contagion, as on isolated ranches. Family history and childbirth were far more frequently the apparent predisposing cause; occupation was quite a negative factor. All were under the best conditions as regards nutriment, and no syphilis or exposure to weather could be traced. In two cases over-exertion seemed to play an important part in inducing hemorrhages; and in one case a fall from a horse had a like effect. The general result was fatal. The disease ran a more rapid course than the average case of consumption; some 80 per cent. died at the end of the second year from the time the first symptom of the disease was observed. Pulmonary hemorrhage was no more frequent in these cases than in cases contracting the disease elsewhere. The sputa showed very much the same characteristics as observed in cases that were imported; tubercular bacilli averaged in number and shape the same; there was no more and no less elastic tissue, and streptococci, with ordinary micro-organisms, showed nothing unusual due to climatic influences.

In regard, therefore, to infection, the fact that so many consumptives are brought into such close contact with well people in Colorado Springs seems, no doubt, a clear evidence that a risk in proportion to the exposure must logically result. Theoretically considered, such an opinion, based on well-known laws and statistics of other cities, would be safe to follow, other things being equal; but other things are not equal. A factor of six thousand feet altitude comes in, and, as I shall show, not theoretically but practically from statistics, this six thousand feet exerts a very strong and important action in limiting the extension of tuberculosis in Colorado Springs. This is also not an isolated instance:

Colorado Springs is not alone in having such a low record. The low mortality from non-imported consumption contracted in Colorado Springs has its counterpart in other cities in this elevated dry belt. Even Denver, a city of 150,000 inhabitants, with tall buildings shutting out the sunlight, industrial occupations which are so conducive to tubercular increase, and, in addition, a large proportion of consumptive invalids scattered among its other inhabitants, had, as shown by the reports, only sixty-four deaths from non-imported consumption (less than half of a death to the thousand) in 1896.¹ The average city would show four hundred and fifty deaths per year to 150,000 inhabitants, without the climatic factor possessed by Denver. I sent out in April fifty circular letters to doctors in Utah, Arizona, Wyoming, New Mexico, and Colorado, asking the number of cases seen or heard of by them, and the number of years each had practised in his present locality. In this way I took in fairly well the dry belt, some of which was at one thousand feet altitude only. The result from answers received was two hundred and three years' observation in practice and one hundred and thirty cases of non-imported phthisis reported—fully 80 per cent. of which were either from Salt Lake City, in native Mexicans in New Mexico, or in an altitude below three thousand feet. This compares well with results observed in other parts of the world. Hirsch, in quoting Corbal, states that in the *Grand Duchy of Baden* phthisis increases in a regular ratio to the increase of population, due to overcrowding, but probably more especially to indoor occupations taking the place of outdoor or agricultural ones. It was also found that phthisis diminished in a regular ratio as the altitude increased, so that my results show merely what had been observed before, with the exception that a town being filled with phthisical invalids did not seem to affect the result in the slightest degree. So far as I could judge, the factors of bad nutrition, overcrowding, indoor occupations, and low altitude contributed the main factors toward the phthisical increase in a climate the effects of which are to confer an immunity from tubercular infection as a rule.

The point of interest now comes up as to what factor in a dry elevated climate confers, to such a great degree, immunity from tubercular infection. As has been shown, in very many respects the sanitary environment of people in such cities as Colorado Springs and Denver closely resembles that of the inhabitants of any average city in the United States. A constant population has lived for years, occupied in indoor occupations—a population much more exposed to contagion from dried sputa in the atmosphere than any average city, as the tubercular invalids are so markedly in excess—and then many are predisposed by family history to the disease, so that if other things were equal it would be only

¹ Denver Bureau of Health, W. P. Munn, Health Commissioner. Report for 1895-96.

logical to infer that a very large death-rate from non-imported consumption should occur. The reason that it is not so and that the death-rate is so low compared to other cities must be some climatic influence. This climatic influence, that also favors recovery from consumption, is, no doubt, composed of many factors. Very briefly, they can be stated as follows: The tubercular germ distributed as dust is much more likely to lose its virulence, exposed in a climate where the sunshine is so constantly present and the air is so thin. The air-cells of the average lungs are more used, more brought into healthy action, at an altitude of six thousand feet. The increase, as told by the spirometer and by chest measurements, is very marked in new-comers to the dry elevated climate; and it follows that organs so exercised, both by increased ventilation and by increased blood supply, do not so readily become a suitable medium for the growth of tubercular bacilli.

EXPERIMENTS TO DETERMINE THE EFFECT OF SUNLIGHT UPON TUBERCULAR SPUTUM.

Animals used, guinea-pigs. Seat of inoculation, left thigh.

Number of animals inoculated with exposed sputum.	Length of exposure.	Number inoculated with non-exposed sputum.	Of which died within 20 days with		Of which died or were killed after 30 days, having			
			Local tuberculosis.	Other diseases.	General tuberculosis.	Glands generally and spleen affected.	Glands or abscess local.	Other diseases.
1	1½ hrs.	...	...	...	1			
4	2 h. 5 m.	...	2	1	...	1		
2	24 hrs.	...	2					
...	...	6	1	3	1	...	1	

EXPERIMENTS WITH DUST FROM HOTEL AND SANITARIUM.

Animals inoculated with dust from				No. died on 9th or 10th day.	No. died on 20th day.	No. died on 36th day.	No. killed between 36th and 40th day.	No. showing any tubercular affection.	No. died of other causes.	Number square yards dust used.
Halls of hotel.	Sleeping-rooms of hotel.	Sitting-rooms of sanitarium.	Sleeping-rooms of sanitarium.							
5	...	...	...	...	...	...	5	...	...	½ s. yd.
...	3	...	...	2	...	...	1	...	2	½ s. yd.
...	...	1	...	...	...	1	...	...	1	1 s. yd.
...	...	...	3	...	1	...	2	...	1	1 s. yd.

GARDINER: TUBERCULAR INFECTION.

Date.	Experiment number.	Quantity of sterile water used to dilute dust.	Quantity of solution inoculated.	Dust taken from sanitarium or hotel.	Occupancy of rooms by phthisical patients.	Number of bacilli found in sputum of occupant.	Stage of disease patient suffering with.	Sq. yards of dust used.	Number of days animals lived after inoculation.	Extent of tubercular affection.	Died of other diseases.	Number of days animals had lived in Colorado before inoculation.
March 4, 1897	1	2½ c.c.	2 c.c.	Hotel.	Halls.	.....	.....	½ sq. yd.	Killed 35 days.	Negative.	.....	7 days.
March 4, 1897	2	2½ c.c.	2 c.c.	Hotel.	Halls.	.....	.....	½ sq. yd.	Killed 37 days.	Negative.	.....	7 days.
March 4, 1897	3	2½ c.c.	2 c.c.	Hotel.	Halls.	.....	.....	½ sq. yd.	Killed 37 days.	Negative.	.....	7 days.
March 4, 1897	5	2½ c.c.	2 c.c.	Hotel.	Halls.	.....	.....	½ sq. yd.	Killed 38 days.	Negative.	.....	7 days.
March 4, 1897	6	2½ c.c.	2 c.c.	Hotel.	Halls.	.....	.....	½ sq. yd.	Killed 40 days.	Negative.	.....	7 days.
March 4, 1897	7	2½ c.c.	2 c.c.	Hotel room.	4 months.	.....	.....	½ sq. yd.	Died 9 days.	Negative.	Intestinal causes.	7 days.
March 4, 1897	8	2½ c.c.	2 c.c.	Hotel room.	4 months.	.....	.....	½ sq. yd.	Died 10 days.	Negative.	Intestinal causes.	7 days.
March 4, 1897	18	2½ c.c.	2 c.c.	Hotel room.	4 months.	.....	.....	½ sq. yd.	Killed 40 days.	Negative.	.....	7 days.
March 3, 1897	21	2 c.c.	2 c.c.	Sanitarium.	Sitting-room	.....	.....	½ sq. yd.	Died 36 days.	Negative.	Exposure.	6 days.
March 3, 1897	25	2 c.c.	2 c.c.	Sleeping-room, sanitarium.	4 months.	2 to 3 in field.	Third.	1 sq. yd.	Killed 37 days.	Negative.	.....	6 days.
March 3, 1897	26	2 c.c.	2 c.c.	2 sleeping-rooms in sanitarium.	4 months, 3 weeks.	2 to 3 and 10 to 15 in field.	Second.	1 sq. yd.	Died 20 days.	Negative.	Unknown	6 days.
March 3, 1897	27	2 c.c.	2 c.c.	Sleeping-room, sanitarium.	6 months.	1 or 2 to field.	Second.	½ sq. yd.	Killed 40 days.	Negative.	.....	6 days.

The blood itself is markedly changed at six thousand feet altitude.¹ It has been shown by Egger and Paul Bert in the Andes, Muntz, Vicault, Koeppe, and Woolf in Europe, that the blood in individuals living at six thousand feet and upward above the sea is increased in specific gravity, with, also, an increased number of red corpuscles and an increase of hæmoglobin, giving the blood greater power to absorb oxygen; and, with all this, also an increased muscular power of the heart, thus insuring to the blood in several ways an increased germicidal power, and, what is probably more important, a stimulation to tissue change—all of these conditions of the blood being antagonistic to tubercular infection.

The tonic effect of altitude and cold nights is, too, a stimulant of decided value to the nervous system, much as strychnine acts, by increasing the appetite, etc. There is also the dryness to be considered, the absence of moisture in the air itself being well known at any considerable altitude, the dryness of the soil probably being the more important of the two. Bowditch, Buchanan, Pepper, Trudeau,² Elliot—all have shown that the relation between damp soil and phthisis is a constant one; and, no doubt, some subtle influence exists by which our dry regions, such as Colorado, etc., with sandy and gravelly soil, exert an effect on the extension of tuberculosis.

Then, also, as it is now known that tubercular infection frequently arises from milk or the meat of tubercular cattle, that danger is now reduced to a minimum in Colorado and like climates. I will quote from an article of mine published elsewhere:³ "These facts are not confined to mankind. A general immunity, from living in this country, is also found in domestic cattle. In dairy herds, where general environment, character of food, shelter, and all conditions bearing on general health are far more likely to be the same in any climate than those of man, we have the same result, viz., that consumption in the native cattle of Colorado is a most infrequent occurrence. Careful reports show that, all through a large part of the United States, cattle are sacrificed to this plague of tuberculosis or consumption, and the opinion is gaining ground that milk taken from cows so diseased and used for food is, in a large measure, responsible for many cases of consumption occurring in mankind. Reports show that some 25 to 50 per cent. of the cattle of humid and non-elevated States are tuberculous. The reports of the State Veterinary for Colorado show only 2 per cent. in our herds (when the tuberculin test has been made). I am assured that it is so rare a disease

¹ Solly, *Therapeutic Gazette*, February, 1896, quotes Dr. Egger's paper read at Congress for Innere Medizin, 1893.

² *Environment in its Relation to the Progress of Bacterial Invasion in Tuberculosis*. American Journal of the Medical Sciences, July, 1887.

³ Gardiner: Letter to the Sun, New York City, April, 1897.

among Colorado cows that it is almost a curiosity; and when it does occur, it is usually either in animals that have had the worst of care as regards overcrowding or in imported animals; native cattle are nearly immune. The testimony from all over our high dry plateau, at from five to eight thousand feet altitude, is the same. So, if it is true that consumption is very often contracted by drinking milk from consumptive or tubercular cows, the fact of Colorado's cattle being so remarkably exempt from this disease only adds another factor to our safety. If only two cows to the hundred have consumption in Colorado and twenty-five to fifty to the hundred have consumption in the East and elsewhere, there is not much room for doubt as to the comparative danger from milk infection. In a drink of milk taken in any of our average cities below two thousand feet altitude we run about 30 per cent. more risk of taking consumption than we do from a glass of milk in Colorado."

An interesting question is, Will such an immunity as exists, for example, at Colorado Springs remain constant? I think that it will, for the following reasons: We know that, as regards indoor occupation, contact with tubercular invalids, and lack of sanitary precautions, the maximum danger has been about reached. For some years past all these factors have had full opportunity to exert their baneful influence, and the results show for 1896 no increase in non-imported consumption; and in the future, although it is true the city may become more crowded, this fact or danger will be clearly met and defeated by the sanitary precautions enforced, as a law passed in 1897 fines any one from one to five dollars for expectorating on the sidewalks; and the sanitary condition of the city will be constantly improved to such a degree that it is safe to predict that we can not only keep our present low percentage of infection from tuberculosis, but will even lower it in the future.

MULTIPLE SCLEROSIS IN CHILDHOOD,

WITH A REPORT OF THREE CASES.

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THE first case of disseminated sclerosis occurring in a child was published by Schuele in 1871. It is at the same time one of the three cases of the kind in which an autopsy confirmed the clinical diagnosis. Schuele's case was followed by the publication of a number of English observations (Dreschfeld, Pollard, Bristowe, etc.), and in 1879 by the report of two cases from Erb's clinic by Ten Cate Hoedemaker, who, in reviewing the cases previously recorded, only accepted Schuele's and

Dreschfeld's cases as satisfactory. In 1883 Marie¹⁸ wrote a paper on the subject, collecting in all thirteen cases from literature and adding a case observed by Charcot and himself; his list at the time included the cases Hoedemaker had refused to accept. Unger,⁴⁰ in Vienna, published in 1887 an elaborate monograph upon the occurrence of multiple sclerosis in children, and increased Marie's list of cases to nineteen, one of them a case of his own observation. A number of publications reporting one or two cases of the kind followed in the German, French, and English medical journals. In 1893 Totzke, a pupil of Mendel, in Berlin, published two new cases in a dissertation, and reviewed all the cases published after the appearance of Unger's monograph, tabulating thirty-nine cases up to date. In this country Pritchard³⁵ wrote a chapter on multiple sclerosis in Keating's *Encyclopædia of the Diseases of Children*, and Sachs³⁷ devotes a chapter to the disease in his book on *The Nervous Diseases of Children*, bringing the subject up to current times.

Having had the good fortune to observe at the Mount Sinai Hospital Dispensary and in my private practice three cases of the disease in children during the past year, I was led to inquire into the frequency of its occurrence at this age and to study the special literature on the subject. This study has forced the conviction upon my mind that the diagnosis of multiple sclerosis in a number of the cases published as such could be fairly challenged, and that the various statistical tables include cases which should properly be classified under other headings. It is not the purpose of this paper, however, to pass judgment, case for case, upon the previously reported cases; that would hardly repay the effort. Having missed in the previous writings—even in Unger's valuable monograph—an exhaustive discussion of the diagnosis of the disease as it occurs in children, I propose, after submitting the histories of my three cases to your kind criticism, to discuss at some length this very point—the differential diagnosis. Inasmuch as recent years have added much to our knowledge of the nervous diseases of children, new types having been created and old ones modified, an effort in this direction, I trust, will not be devoid of interest.

CASE I.—Anna F.,* of German parentage, nine years of age, the eldest of five children; was born spontaneously after somewhat prolonged labor. The child is said to have been blue in the face at its birth, but began to cry after a few moments. Its mother is a large, robust, perfectly healthy woman, and has never miscarried. The father is of good health, and has been a moderate drinker of beer. Of the five children, one died of scarlet fever and one of croup. There is no history of syphilis, nor does the examination of the mother and her three children reveal any indication of the disease. The other two children

* The patient was presented on October 23, 1895, before the Society of German Physicians, and was seen there amongst others by Drs. Sachs, Jacoby, and Laszinsky.

living are in perfect health, and show no signs of the disease the patient is suffering from.

Previous History.—When the child was three months old a number of furuncles broke out on the face and neck, beyond which they did not spread. Starting from one of these an attack of erysipelas developed, which spread over the face and scalp. It had hardly subsided when a relapse occurred. In all the child was ill for three weeks, high fever accompanying both attacks. At no time were there any convulsions. The mother states that soon after she noticed that the child's hands trembled. The patient was two years old before she learned how to walk and talk, the younger children learning both when nine to twelve months old. The gait of the child did not differ from that of other children. Her speech has always been slow. Two years ago she was taken with a severe attack of scarlet fever, and was sick for six weeks. For three months thereafter her speech was very much worse than before; it was so bad that her mother had great difficulty in understanding her. Then her speech gradually improved, and at present it is not much worse than before. The tremor in the hands increased after the scarlet fever. The child goes to school, but has great difficulty in "keeping up." She does not learn nearly as well as her younger brother and sister. "She is of good disposition, but not bright," according to her mother's statement. She laughs and weeps very readily, and at times immoderately, without any apparent motive.

On October 17, 1896, she was brought to me at the Mount Sinai Hospital Dispensary.

Physical Examination.—The child is rather small for her age, but otherwise well developed and in good general health. The pupils are equal, and respond well to light and accommodation. There is no nystagmus and no ocular-nerve palsy. The fundus and vision, kindly examined by Dr. Koller, are perfectly normal. There is considerable hypermetropia.

There is a slight tremor of the tongue, which is protruded straight. Facial innervation is equal on both sides. Taste and hearing are good. There is a slight general weakness of the muscular frame; nowhere any rigidity. The deep reflexes of the arms are lively, the *knee-jerks* are both *exaggerated*, *ankle-clonus* can be occasionally obtained from the right foot; the Achilles-tendon reflex of the left foot is very active. There is a very marked *intention tremor* present in both hands, more in the right than the left. In seizing a glass of water and attempting to drink from it the tremor is very characteristic. When the glass is full the patient is apt to wet her clothes. The amplitude of the tremor increases somewhat as the destination is approached. The degree of tremor varies considerably according to the child's emotional condition. It is very noticeable when she attempts to write. Several characteristic specimens of her handwriting were obtained.

The patient's gait is easy; there is neither ataxy nor spasticity noticeable. In running she is not as quick as other children of her age. There is no muscular atrophy, and the electric examination shows normal conditions. Her voice is *hoarse*, and has always been so; it breaks easily. A laryngoscopical examination has not been possible as yet. Her *speech* is *slow* and *monotonous* in intonation. Mentally the child is backward and deficient. In conversation she impresses one as a child of four or five would, and not even as a bright child of that age. Her

internal organs are sound; the urine is free from sugar and albumin; the bladder and rectal functions are normal.

To recapitulate briefly the conditions presented by this case, we have a child of nine years who suffered a severe attack of erysipelas when three months old and an equally severe attack of scarlet fever when seven years old. At the present day we find a marked *intention tremor* of the hands, *exaggerated knee-jerks*, and an occasional *ankle-clonus*. The voice is hoarse, speech slow and monotonous. The child is of impaired mental capacity, cries and laughs easily.

For the present suffice it to state that this symptom complex is characteristic of multiple sclerosis. A few points concerning the differential diagnosis will be referred to later on.

CASE II.—Bertha S., eleven years old, of American parentage, was brought to my office in September, 1895, and was seen but a single time, as she lives in another town of this State. She is the second of two children. The older child is perfectly well. She was born at term and without difficulty. Her mother is of a nervous temperament, of average health. On the father's side there has been no indulgence in liquor and no syphilis. There is no history of previous nervous or mental disease in the family. The child was always regarded as nervous, but never had convulsions. Her eyes have always been prominent. Some years ago she suffered for some weeks from complete *ptosis of the left eyelid*, which disappeared under electric treatment. She never complains of headache, and does not vomit. There is occasional *vertigo*. For the past year she has lost control of her bladder to a great extent; at times she wets herself without knowing what is going to happen; at other times she is unable to retain her water when she feels it wants to come. At the very best she must hasten to empty her bladder in order not to wet herself. She has been *weak and unsteady on her legs* for the past two or three years. Of late her gait has been getting worse.

Physical Examination.—The girl is fairly well developed, of good size for her age. The head is large, rachitic in shape, 54 cm. in circumference. The eyes are prominent, as in exophthalmic goitre. There is divergent squint, owing to weakness of the right internal rectus. There is a fine *nystagmus* while the eyes are at rest; upon extreme excursions the nystagmus increases and becomes *jerky* in character. The ophthalmoscopic picture shows optic atrophy in both eyes, more advanced in the right eye. Vision: O. D. = 10/XLV; O. S. = 10/XLV. Not improved by glasses. The visual field was not determined. The pupils are large and respond to light and accommodation. There is a fine tremor of the fingers while the patient is at rest. Upon motion there is a very marked *intention tremor* (finger-pointing, glass of water tests). The tremor is about equal in both hands. There is no loss of power and no rigidity in the arms. The gait is that of an *abrie paraplegia*, with a very evident *cerebellar grogginess* added. The child sways when standing with her eyes open, and is unable to stand with them closed. The *knee-jerks* are greatly *exaggerated*. There is right *ankle-clonus*, on the left side an increased reflex from the Achilles-tendon. There is some rigidity in the legs, but no contractures. The various special tests show considerable ataxy and disturbance of the muscular sense in the legs. Sensation is perfect in all parts of the body. The examination with the faradic current shows slightly in-

creased excitability in the muscles of the legs, otherwise normal conditions. The child is of good intelligence; is easily frightened, trembles when nervous. Speech is not affected. The pulse is 84, and the internal viscera are sound. There is no tenderness to percussion in any part of the head.

The morbid conditions presented in this case are: *optic atrophy, strabismus, nystagmus, and previous ptosis* as eye symptoms. *Intention tremor, some rigidity of the legs, increased knee-jerks and ankle-clonus, a cerebellar ataxo-paraplegic gait, the Romberg symptoms, and loss of control of the sphincter of the bladder.* The observation is in some respects, I am well aware, imperfect, as is almost always the case when but a single examination has been possible. Nevertheless, the clinical picture is sufficiently clear to allow a positive diagnosis, the diagnosis having to take account of multiple sclerosis, Friedreich's ataxy, ataxic paraplegia, tumor of the brain, and hereditary cerebellar ataxy. Friedreich's ataxy can be excluded by the exaggerated knee-jerks, and ataxic paraplegia by the eye-symptoms. The reasons for excluding brain tumor and hereditary cerebellar ataxy will be given later in the course of the discussion of the diagnosis in general.

CASE III.—Anna F., aged fifteen years, of Russian parentage, was first seen at the Mount Sinai Hospital Dispensary, March 30, 1896, and was observed for some time. The family history is negative. She was born at term without any difficulty. She was always well until she was seven years of age, when she was taken ill with a severe cold, which, from the description given, may have been an attack of influenza. Shortly after this she began to have difficulty in walking, becoming unsteady on her feet, and tiring more quickly than before. At the same time her *speech*, which had been fluent, began to be *slow and difficult*, and her *fingers* began to *tremble* so that she could no longer sew, had difficulty in buttoning her clothes, and could not eat soup from a spoon without spilling. Her *legs* gradually became *stiff*, and the tremor in her hands has increased during the past year. She is subject to *vertigo*, which is, however, never very severe. No headache. There never has been any ocular nerve palsy and no vesical trouble.

Physical Examination.—The girl is mature for her age, broad-shouldered, and in robust general health. Her voice is harsh, and in her *speech* there is a *noticeable effort* as she slowly utters syllable for syllable with little or no variation of intonation. Her voice is also apt to break. There is no nystagmus; the pupils are equal and respond well. The ophthalmoscopic examination shows normal disks with some congestion of the veins (Dr. Koller). There is a classical, *oscillatory tremor* in her hands, which appears as soon as she moves them for any purpose. In attempting to drink from a glass of water she spills the water if the glass is more than half filled. The tremor is more vehement when the patient is *nervous*; at such times her head shakes. The deep reflexes of the arms are very lively. The gait is that of a *spastic paraplegia*; her toes do not, however, cling to the floor; at times there is some swaying. No Romberg. The *knee jerks* are greatly *exaggerated*; there is *ankle-clonus* on both sides, and there is some rigidity in the legs. The patient is of average mental capacity.

The *laborious speech*, the *intention tremor*, and *spastic paraplegia* in this case were so classically developed that in spite of the absence of

eye-symptoms the diagnosis of multiple sclerosis could be made without hesitation.

DIAGNOSIS.—Naturally the differential diagnosis of multiple sclerosis in childhood must follow somewhat different lines than those laid down for the same disease in the adult. From a study of the cases recorded, and of my own cases, I find that the following diseases may have to be considered in the presence of a given case:

1. Infantile cerebral palsy.
2. Syphilis of the cerebro-spinal axis.
3. Hereditary spinal ataxy (Friedreich).
4. Hereditary cerebellar ataxy (Marie).
5. Acute disseminated myelitis (Leyden).
6. Tumor of the brain.
7. Hysteria.

1. Increased myotatic irritability, spastic paralysis, and rigidity, representing various degrees of one and the same morbid condition, confined to the legs or involving all four limbs; mental impairment; partial or complete hemiplegia and strabismus are conditions common to both multiple sclerosis and the infantile cerebral palsies. In his monograph on *Cerebral Diplegias*, Freud furthermore points out that the symptoms considered most characteristic of multiple sclerosis—the intention tremor, the nystagmus, and the bradyphasia—are occasionally observed in cases bearing all the marks of a cerebral diplegia. It is true it is comparatively rare that we find more than one of these three symptoms present in a case of this kind, and there is no instance on record in which all three were observed. Nevertheless, if they occur singly or two at a time, Freud argues, there is no reason why they should not occasionally be seen simultaneously; nor are the cases of multiple sclerosis common in which this symptom-triad is complete. Of the thirty-five cases reported in children I have found but nine cases (Schuele, Charcot-Marie, Hochemaker, Dreschfeld, Totzke, Schoenfeld, and Unger) in which intention tremor, nystagmus, and bradyphasia were noted. The many points in common between the two morbid conditions indicate the difficulties that may be encountered in attempting the differential diagnosis; and these difficulties are enhanced by a common etiology, both occurring after the acute infectious diseases. I have emphasized the close resemblance possible in the clinical picture of these two diseases for the reason that in a number of the cases recorded as multiple sclerosis in children the diagnosis of diplegia would have been more justifiable. Marie has voiced this view already by confessing in his *Leçons sur les Maladies de la Moelle*, in 1892, that his series of fourteen cases, published in 1883, included quite a number (*un bon nombre*) which he would to-day classify under the heading of infantile cerebral palsies. In looking over all the cases reported I find that those of Dick-

inson, Sparks, Humphreys, Cheadle, Bodson, Railton, probably one of Freund's and one of Bruns's cases, and perhaps two or three others, are cases of this kind. The majority of these were published at a time when a knowledge of the great frequency and of the clinical features of infantile cerebral palsies had not yet become common property through the writings of Gowers, Marie, Freud, Osler, Sachs, Peterson, and others.

To avoid any misunderstanding, it will be well to state here that in the large majority of cases of infantile cerebral palsy the question as to the presence of disseminated sclerosis will not arise at all; the boot is rather on the other leg—that is to say, in every case of supposed multiple sclerosis in childhood, and especially in *early* childhood, the far more common condition of infantile cerebral palsy will have to be excluded.

In spite of the close resemblance in the symptom complex of the two diseases which has been pointed out, in most if not all cases a differential diagnosis will be well possible. In this respect a consideration of the mode of onset and of the course of the disease is of supreme importance. Infantile cerebral palsy is either congenital or a disease of acute onset; in the congenital or birth-palsies a history of difficult labor, instrumental delivery, or premature birth is of great diagnostic weight. Such a history should make us exceedingly chary of making the diagnosis of multiple sclerosis in early childhood. In these cases there may be an apparent development of the symptoms as the child grows older and the disorders of motion and speech and the mental impairment become manifest. In the acquired forms of the disease, in which acute infectious diseases, endocarditis, and convulsions are the main etiological factors, the symptoms produced by the acute lesion make their appearance immediately, and there is little or no further development; on the contrary, there may be some retrogression in the symptoms, very much as in the cerebral palsies of adult life. Although the morbid process in infantile cerebral palsies may not be absolutely stationary, but may, according to Marie's views, continue as an eccentric secondary sclerosis, it is always localized—*i. e.*, it may involve immediately adjacent areas, but cannot affect distant parts of the cerebro-spinal axis.*

In disseminated sclerosis the conditions are quite the reverse. Occasionally the onset may be acute or subacute, especially in the cases which develop immediately after an acute infectious disease; but the morbid process, once started, does not cease with the first onset. It breaks out afresh again and again in any part of the cerebro-spinal axis and its

* New foci of disease may, however, develop in the presence of an endocarditis, causing recurrent embolism, or by fresh hemorrhages occurring during convulsions. Such an occurrence is very rare, and may have given rise to the diagnosis of multiple sclerosis in the case of Humphreys.

nerves, adding new symptoms to the old. Another point of distinction of considerable value is the fact that many of the symptoms in multiple sclerosis show a very marked tendency to improve and disappear. This is especially true of the ocular nerve palsies, of which we have a good illustration in the temporary ptosis noted in Case II. As Oppenheim has pointed out, the tendon reflexes, the field of vision, and the disturbances of sensation may vary even from examination to examination. To express briefly what has been explained at length, *multiple sclerosis* is a *progressive and retrogressive, infantile cerebral palsy* a *stationary* disease.

When the mode of onset and the course of the disease do not throw sufficient light upon a case, other points may furnish the desired key. In Case I. the history of a somewhat prolonged birth (first child) would justify the suspicion that it is a case of infantile cerebral palsy. Beside the fact that the course of the disease, especially the increase of the symptoms after the scarlet fever, favors the diagnosis of multiple sclerosis, I believe the following point is conclusive: In cerebral diplegia the legs are never less affected than the arms. As a general rule, they are more affected. In our case the arms are much more involved than the legs.*

Optic atrophy,† especially partial discoloration of the disks, which is almost pathognomonic of multiple sclerosis, central scotoma, or contraction of the field of vision, may furnish decisive evidence in a doubtful case.

It will be seen that no reference has been made to the presence of the cardinal symptoms of disseminated sclerosis as bearing any weight in the differential diagnosis. In this connection it may be stated that intention tremor, nystagmus, and bradyphasia are the rule in multiple sclerosis and the exception in infantile cerebral palsies. In the presence of two or three of these symptoms, providing they are present beyond cavil, it will require strong evidence to the contrary to throw out the diagnosis of multiple sclerosis.

2. It is well known that in the adult *multiple cerebro-spinal syphilis* may produce conditions which it is exceedingly difficult to distinguish from multiple sclerosis, so much so that so able an observer as Oppenheim, who has done much to further our knowledge of the clinical course of both these diseases, only recently published some cases through Cassirer,‡ in which a positive differential diagnosis was not possible. Although rare, cases of this kind may occur in children, as is shown by three cases published by Moncorro in an article entitled "On the Etiology of Insular Sclerosis in Children, with Special Reference to the

* Freund cites a somewhat similar case in a twin in his monograph, in which he makes the diagnosis of diplegia, p. 153. In his case there was rigidity of the legs.

† Optic atrophy is observed in rare cases of infantile cerebral palsy.

Pathogenic Influence of Hereditary Syphilis," which appeared in the *Revue Mensuelle des Maladies de l'Enfance*, 1887, vol. v. All of these three cases, occurring in children three or four years of age, and showing cutaneous lesions of hereditary syphilis, presented typical symptoms of insular sclerosis, and were diagnosed as such (Moncorvo). They all recovered under specific treatment. Although Moncorvo attempts to show the importance of syphilis as an etiological factor in the causation of multiple sclerosis, on the basis of these cases, we need not hesitate, I believe, in refusing to regard his cases as examples of the disease at all. They illustrate rather how well specific diseases may imitate the clinical picture of disseminated sclerosis even in the young. In one of the two cases of multiple sclerosis in children reported by Dickinson hereditary syphilis was present. There is no mention of specific treatment having been instituted.

It is not within the scope of this paper to discuss at length the differential diagnosis between multiple cerebro-spinal syphilis and disseminated sclerosis. That is a chapter in itself. Suffice it to say that the same considerations which enter into play in adults hold good in the young. In the latter we are apt to find, as in Moncorvo's cases, valuable evidence in the presence of the ordinary signs of hereditary syphilis.

3. *Hereditary spinal ataxy* shares with disseminated sclerosis a number of important symptoms—the nystagmus, the disturbance of speech, and an ataxic tremor of the extremities, which bears a certain though remote resemblance to an intention tremor. In the various articles on disseminated sclerosis in children the differential diagnosis between this disease and Friedreich's ataxy is entered into very fully. I believe that it is rarely difficult to differentiate between the two in practice. The main differences may be summed up as follows:

<i>Friedreich's Disease.</i>	<i>Multiple Sclerosis.</i>
Knee-jerks lost or diminished.	Exaggerated.
Eyes, pupils and fundus normal; ocular nerve palsies very rare.	Pupils frequently unequal, reflexes may be lost; discoloration of the optic disks; amblyopia; ocular nerve palsies common.
Speech halting and explosive, blurring.	Laborious, monotonous, and scanning.

Proof of heredity would be of little diagnostic value, as multiple sclerosis has been observed in more than one member of a family (Dreschfeld, Totzke, Leusch-Huber). At the Mount Sinai Hospital Dispensary I have seen multiple sclerosis in a man of thirty years, who stated that his father had suffered for many years from the same disease and had ultimately died of it.

4. According to Marie,²⁰ who first classified the atypical cases of hereditary ataxy published by Fraser,⁸ Sanger Brown,⁵ Nonne,²⁶ Klippel and Durante, and a number of other writers, giving them the name of *hereditary cerebellar ataxy*, to distinguish them from Friedreich's

disease, a distinctive feature of this type is its onset after the age of puberty. That it may occur earlier is shown by Fraser's original cases, in which it began in the third or fourth year. In Sanger Brown's twenty-one cases the disease began once each at the age of six, eight, eleven, thirteen, and twice at fourteen years—in all, six times before the age of fifteen. Recently Collins has published an interesting though atypical case in a boy of eleven years. The question as to whether multiple sclerosis or hereditary cerebellar ataxy is present may therefore arise in children as well as in adults, and does arise, for instance, in our second case.

The close similarity in the symptoms of these two diseases is evident in the following comparisons:

Hereditary Cerebellar Ataxy.

Multiple Sclerosis.

- | | |
|--|--|
| 1. Gait, ataxic, groggy; feet wide apart. | 1. (a) Spastic paraplegia; feet close together.
(b) Ataxic, groggy; feet wide apart. (c) Ataxic paraplegia (a + b). |
| 2. Station, Romberg's symptom absent. | 2. Romberg may be present. |
| 3. Arms, ataxy and some intention tremor. | 3. Intention tremor; sometimes ataxy. |
| 4. Oscillations and jerky movements of the head and trunk. | 4. Oscillations and jerky movements of the head and trunk. |
| 5. Exaggerated contractions of facial muscles during speaking. | 5. Twitching in facial muscles during speaking. |
| 6. Speech, hesitating and abrupt, or simply monotonous. | 6. Laborious, scanning, or monotonous. |
| 7. Eyes, jerky nystagmus; optic atrophy, contracted field of vision. The external recti muscles may be paretic or paralyzed. | 7. Jerky nystagmus; optic atrophy, contracted field of vision; ocular nerve palsies. |
| 8. Myotatic irritability increased; knee-jerks exaggerated, ankle-clonus; contractures and muscular rigidity. | 8. Myotatic irritability increased: knee-jerks exaggerated, ankle-clonus; contractures and muscular rigidity. |
| 9. Mental impairment in varying degrees. | 9. Mental impairment in varying degrees. |
| 10. Vertigo sometimes. | 10. Vertigo common. |
| 11. Vesical functions rarely affected. | 11. Vesical functions more frequently disturbed. |
| 12. Apoplecticiform seizures do not occur. | 12. Apoplecticiform seizures occur in a small proportion of cases. |
| 13. Heredity common. | 13. Heredity uncommon. |

On account of the close similarity in the symptoms of the two conditions, the differential diagnosis in a given case may be very difficult or even impossible. In Case II. the gait corresponded very well to that of hereditary cerebellar ataxy. It was ataxic, there was a tendency to reel, and there was some rigidity of the legs present. The increased knee-jerks, the optic atrophy, the amblyopia, and the jerky nystagmus all fitted well into this clinical type. The features which allowed the diagnosis to be made in favor of multiple sclerosis were (1) the history of a previous ptosis which disappeared under treatment; a temporary ocular nerve palsy is very characteristic of disseminated sclerosis. (2) The paresis of the internal rectus muscle. (3) The presence of the Romberg symptom, which is said not to occur in hereditary cerebellar ataxy.

(4) As supporting factors: the weakness of the sphincter of the bladder and the age of onset.

The absence of heredity is of no diagnostic value, as a number of isolated cases of hereditary cerebellar ataxy have been published. Some of them, it is true, may turn out to be cases of multiple sclerosis upon autopsy.

The difficulties the diagnosis may encounter are well illustrated in the following case, in an adult, which has been under my observation for more than two years:

Mrs. S., aged thirty years, born in Germany, was first seen at the Mount Sinai Hospital Dispensary on August 17, 1894. She has been married eight years and has had two children, both in good health and free from any nervous disorder. She has had four miscarriages, which were brought on intentionally. Her father died at the age of fifty-four years from hasty consumption. Her mother is fifty-nine years old, and in good health. A younger sister of the patient, though not very bright, and a brother are perfectly well. The patient's maternal grandfather was insane and committed suicide.

As a young girl the patient suffered from her fourteenth to her nineteenth year from chlorosis. Shortly after she had some weakness in her legs, especially in the right one, which, she says, she dragged; she had no pains in the legs. After two or three months, under turpentine rubbings, the trouble disappeared. Ever since, however, she states she has been a little unsteady on her legs. When she was twenty-seven years old the unsteadiness began to increase, and grew worse and worse. When she turns her head, while walking, she becomes so dizzy she is afraid of falling. She has never suffered the least pain in her legs or any other part of the body. No headache, occasional vertigo. During the past two years her hands have become unsteady, so that she cannot sew as well as formerly. She is clumsy in buttoning her clothes, and can write but with great difficulty. Both her legs and arms have grown weaker during this time. She cannot walk far without tiring. There has never been any bladder trouble.

Examination.—The patient is a well-developed woman with little adipose tissue. She walks with her feet wide apart and sways from side to side. Romberg is indicated. In the prone position there is marked ataxy of the legs, which is increased when the eyes are closed. At rest there is no tremor of the hands. Upon motion there is an irregular ataxic tremor, which is most apparent when the patient attempts to button her clothes. She fumbles about the button before she is able to catch hold of it. The tremor has not the oscillatory character seen in multiple sclerosis, and is of very much smaller amplitude. It occurs, however, only as an intention tremor. It is increased when the eyes are closed. The deep reflexes of the arms are very lively. The kneejerks are exaggerated, and there is ankle clonus on both sides. The voice is clear; speech is deliberate, with monotonous intonation. In speaking there is excessive action of the labial muscles. The tongue is protruded straight, without twitching or tremor. The pupils respond well, and are equal in size. Upon looking upward there is rotary nystagmus in both eyes, more marked in the left. Dr. Koller kindly

examined the patient's eyes and reported as follows: Vision: O. S. = 2/LX (fingers), emmetropic; O. D. = 5/XVIII, emmetropic.

Ophthalmoscopic Examination.—Left eye: The temporal half of the optic disk is excavated and of a bluish-green discoloration. The nasal half is more grayish. The disk seems diminished in size; the outlines are not very sharp. There is some increase of interstitial tissue along the larger bloodvessels. The calibre of the retinal vessels is unchanged. The retina is thin.

Right eye: The disk is of normal size, well outlined. The temporal half bluish-green and excavated; nasal half gray. The same changes are seen about the bloodvessels as in the left eye, only in a lesser degree." Dr. Koller adds that "this picture indicates a mixture of the two main types, primary atrophy and atrophy following inflammation. It may be looked upon as a primary atrophy with increased interstitial tissue growth." The visual fields show irregular contraction for white and for green.

There is no sign of any mental impairment.

I have seen the patient on and off during the past two years. During this time she has given birth to a third child successfully, and her condition has remained about the same.

We have in this case, to sum up briefly the symptoms presented, an *ataxic, paraplegic gait*, with *cerebellar swaying*, *increased knee-jerks* and *ankle-clonus*; loss of dexterity and *tremor* in the hands upon movement; *slow speech*, *excessive mimetic contraction* in speaking. In the eyes, *discoloration of the disks*, with *amblyopia* and somewhat *contracted visual fields*.

The diagnosis of locomotor ataxy is, of course, out of the question. A combined systemic sclerosis (ataxic paraplegia) can be but part of the morbid condition in view of the ocular changes. Friedreich's ataxy can be excluded by the exaggerated knee-jerks, the optic atrophy, and the amblyopia. The case corresponds in every respect to the clinical picture of hereditary cerebellar ataxy depicted by Marie. Despite the lack of direct heredity (a strong neuropathic taint is present), I have always regarded it as a case of this type; but I have never been able to convince myself beyond doubt that it is not, after all, one of those instances of disseminated sclerosis in which the intention tremor is absent or but slightly developed, as in the cases with autopsy seen by Leube, Ebstein, Engesser,⁷ Jolly, Gowers, and others. The temporary paraplegia in the legs at the age of nineteen years would rather support this view, although Marie states that remissions also occur in hereditary cerebellar ataxy.

5. In certain cases of *acute disseminated myelitis* and *encephalomyelitis* following the acute infectious diseases the symptoms of an acute or sub-acute multiple sclerosis are presented, more especially the intention tremor, the increased reflexes, and the scanning speech. The disease may ultimately form the basis of a typical chronic insular sclerosis, with its recurrent attacks, etc. It may, however—and that is a point of importance—subside after a longer or shorter period and end in

recovery. Thus, Leyden¹⁴ mentions the case of a child in which he saw an acute disseminated myelitis develop after an attack of grip, and in which there was perfect recovery; and he cites similar cases in adults reported by Lenhartz and Renviers and himself. Among the cases reported as multiple sclerosis in childhood the only one that could be regarded as belonging to this type is one reported by Massalongo and Silvestri in 1893 in the *Revue Neurologique*, No. 23, in which a child of six years developed intention tremor, scanning speech, increased tendon reflexes, muscular rigidity, spastic gait, and some optic atrophy after an attack of grip. The outcome of the case is not reported. In the presence of a case of this kind it is well to remember that we may be dealing with an old case of multiple sclerosis in which the acute infectious disease has simply rekindled the quiescent chronic disease. Thus, it is not unusual to read in the histories of these cases that the symptoms increased after an attack of scarlet fever, measles, diphtheria, etc. Case I. is a case in kind.

6. *Tumor of the brain.* In an instructive paper in the *Charité Annalen*, 1889, entitled "Ein Irrthum in der Diagnose bei einem 9-jährigen Knaben der das Krankheitsbild einer Multiplen Sclerose bot," Westphal describes a case which he had published a year previously as a case of multiple sclerosis in a child, and in which the subsequent autopsy had revealed a tumor of the left optic thalamus. Gowers states that he has seen typical intention tremor in cases of tubercle in the crura and in the pons, and expresses the suspicion that in some of the cases published as examples of disseminated sclerosis in childhood there may really have been a stationary tubercle of the brain. An error of this kind will be avoided if other symptoms of brain tumor are looked for and found. In our second case the possibility of the presence of a brain tumor was considered; the ptosis some years previous to the development of the other symptoms and the vesical weakness militate against such a diagnosis. Nor was there any history of headache, nausea, or any other general cerebral symptoms. A brain tumor giving rise to a cerebellar ataxic gait would be looked for in the cerebellum or at least in the posterior fossa—a location in which the general symptoms are, as a rule, early and intense.

7. Concerning the exclusion of *hysteria*, it may be briefly stated that the presence of ankle-clonus, of nystagmus (unless congenital), or of optic atrophy excludes it at once. A case of hysteria simulating multiple sclerosis will show indisputable hysterical stigmata if they are only looked for. It may occur, however, that hysteria may complicate the organic disease, which actually happened in one of Bruns' cases, in a girl of fifteen years.

TABLE OF CASES OF MULTIPLE SCLEROSIS IN CHILDREN.

No.	Author.	Sex and age.	Previous infectious disease.	Neuro-pathic taint.	Remarks.
1	Barthez et Sanné. <i>Traité clinique et pratique des Maladies des Enfants</i> , 3d ed., Paris, 1884.	M. 10	.....	.....
2	Idem	F. 6	.....	.....	Following convulsions from fright. Recovery.
3	Bristowe. <i>Med. Times and Gaz.</i> , 1879.	F. 13	Measles.	.....
4	Bruns. <i>Berliner klin. Wochen.</i> , 1888, No. 5, p. 90.	F. 15	.....	.....
5	Dreschfeld. <i>Med. Times and Gaz.</i> , 1878, vol. I, p. 140.	M. 9	.....	Yes.	} Brothers.
6	Idem	M. 7	.....	Yes.	
7	Drummond. <i>Lancet</i> , 1887, vol. I, p. 12.	M. 8	.....	.....	Autopsy.
8	Foerster. <i>Jahrb. für Kinderheilk.</i> , 1880, Bd. xv, p. 272.	M. 8	.....	Yes.	Death; no autopsy.
9	Freund. <i>Arch. f. Psychiat.</i> , 1891, Bd. xxii, p. 317.	M. 16	.....	Yes.	
10	Ten Cate Hoedemaker. <i>Deut. Arch. f. klin. Med.</i> , 1879, Bd. xxiii.	M. 8	.....	.....	Convulsions.
11	Idem	F. 10	.....	.....	Fell on head as a baby.
12	Huber. <i>Corresp. Bl. f. Schweiz. Aertze</i> , 1890, p. 43.	M. 7	.....	Yes.	Patient's mother had multiple sclerosis; death. autopsy.
13	v. Kezywiekl. <i>Deutsch. Med. Wochen.</i> , 1892, p. 255.	M. 13	.....	.....
14	Marie-Charcot. <i>Revue de Méd.</i> , 1883, p. 536.	M. 14	.....	.....	Recovery.
15	Massalongo and Silvestrè. <i>Revue Neurologique</i> , 1893, p. 649.	F. 6	Grippe.	.....
16	Mensi, E. <i>Riforma medica</i> , 1892, cited in previous article.	?	?	?	
17	Nolda. <i>Arch. f. Psychiat.</i> , 1891, Bd. xxiii, S. 565.	F. 9	.....	.....
18	Oppenheim. <i>Berl. klin. Wochen.</i> , 1887, p. 904.	M. 12	Scarlet fever.	.....
19	Idem	M. 13	Scarlet fever.	.....
20	Idem	F. 14	.....	.....
21	(<i>Neurol. Centralbl.</i> , 1890, p. 488.) Pollard. <i>Lancet</i> , 1878, p. 183	M. 7	Scarlet fever	.....	Doubtful case.
22	Russel. <i>Lancet</i> , 1889, vol. II, p. 1120	F. 12	.....	.....	Injury to head.
23	Sachs, B. "Nervous Diseases of Children," Wood, New York, 1895.	F. 14	.....	.....	Doubtful case.
24	Schwenfeld. <i>Dissertation</i> , Berlin, 1888.	M. 15	Measles, scarlet fever, diphtheria.	.....
25	Idem	F. 11	Measles, scarlet fever, diphtheria.	.....
26	Schuele. <i>Deut. Arch. f. klin. Med.</i> , Bd. viii, p. 223.	F. 14	Jaundice with nephritis at age of six. Diphtheria.	.....	Death; autopsy.
27	Stadthagen. <i>Jahrb. f. Kinderheilk.</i> , 1884, p. 1.	M. 11	.....	.....
28	Stieglitz	F. 9	Erysipelas, scarlet fever	.....
29	Idem	F. 11	.....	.....
30	Idem	F. 15	Grippe?	.....
31	Totzke. <i>Dissertation</i> , Berlin, 1893.	F. 11	Measles, pertussis, pneumonia	Yes.	} Sisters.
32	Idem	F. 14	.....	Yes.	
33	Unger, L. <i>Ueber Multiple Inselfærmige Sklerose</i> , etc. Vienna, 1887.	M. 6	.....	Yes.	
34	Westphal. <i>Charité Ann.</i> , 1888, p. 459.	M. 11	Pneumonia, diphtheria.	.....
35	Wilson. <i>Brit. Med. Journ.</i> , Nov. 25, 1878.	F. 8	Pertussis.	.....	Convulsions; recovery.

ETIOLOGY. Considerable interest attaches to the etiology of multiple sclerosis. Although earlier writers (Westphal, Ebstein, Charcot, Bourneville, etc.) had noted the occurrence of multiple sclerosis in isolated cases as a sequence to typhoid fever, smallpox, cholera, etc., Marie,¹⁹ in 1884, was the first to urge more generally the significance of a previous acute infectious disease in the etiology of the malady. Although received with favor by many writers, Marie's theory has not yet been generally accepted. In 1891 Oppenheim³⁰ called attention to the frequency with which he elicited in his cases a previous history of metallic poisoning. In a recent publication Strümpell³⁵ enters a plea for the *endogenic* origin of the disease; he assumes a congenital predisposition in the tissues of the central nervous system, especially in the neuroglia, and regards the various causes assigned by other authors as merely provocative factors which arouse the latent disease.

The etiological conditions obtaining in the cases of multiple sclerosis in children may be summed up briefly as follows: In the first of my cases the first symptoms were referred by the child's mother to an attack of erysipelas in early infancy; after an attack of scarlet fever, at the age of seven years, the child's condition became worse. In Case III. the patient's mother dated the disease from a severe cold, which may have been gripe. In Case II. no etiological data could be made out. In Totzke's series of thirty-five cases collected from literature a history of a previous infectious disease was given in thirteen cases (37 per cent.); in ten cases a neuropathic taint was present. In a somewhat modified series I arrive at about the same figures (14 and 8). As far as we may judge from such small figures it would appear that both these influences are of about equal importance in the etiology of multiple sclerosis.

In conclusion, I wish to add that the prognosis in children is not quite as unfavorable as in adults. Three cases have been recorded by competent observers—Barthez-Sanné, Charcot-Marie, and Wilson—in which the symptoms justified the diagnosis and recovery took place. When we consider the well-known tendency to remissions in the course of the disease, and the fact that certain symptoms may disappear completely and permanently, it is not surprising that this tendency should occasionally result in cure. Of course, a prolonged remission must not be mistaken for a permanent cure.

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MALARIA AS A CAUSATIVE FACTOR IN OTHER DISEASES.

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SPITE of all the exhaustive studies on malaria made in this country and abroad, there is still much vagueness in the minds of many practitioners as to what malaria really is and what symptoms or diseases may be justly attributed to it. Malaria is, perhaps, more of a bugbear to the profession at large than any other disease, and were all the evil effects laid at its door truly caused by this disease, it would, next to syphilis, be the disease most to be dreaded in the whole category of ills to which flesh is heir. The ignorant practitioner, unable to find a cause

for some ailment, attributes it at once to malaria, and, unfortunately, the better-informed practitioner falls into the same trap frequently and with less excuse. Malaria does not yet seem to be recognized by the profession at large as a disease with as definite a set of symptoms as typhoid or any other one of the infectious diseases. It is commonly looked on simply as some vague morbid influence existing in the earth or air, which enters in some mysterious way into the human organism, and there acts as a most virulent and long-lasting blood poison.

There is at the present time but little excuse for such ignorance in the profession at large. Twelve years have passed since Laveran published a full and accurate account of malarial fevers and their cause. It is not impossible to obtain either fresh or stained specimens of the malarial parasite, and no student should graduate henceforth from any one of the leading medical schools of this country without having a clear conception of this organism; and at those medical schools in some parts of this country where it may be difficult to obtain such specimens, all the more study should be given to the disease, so that the young medical graduate should start in practice feeling that malaria was just as definite a disease as typhoid, and should long hesitate to at once attribute to it a variety of odd symptoms, whose true cause may be at first hard to find. Malaria does undoubtedly present itself with varying symptoms, but so does typhoid, or diphtheria, or scarlet fever. To recognize the three usual types of malarial organisms is no more, and in fact, is far less, difficult than to recognize the various types of bacteria which every student is now compelled to study. The variations in the morphology of the colon, typhoid, or diphtheria bacillus are far more puzzling than any variations ever seen in the tertian, quartan, and æstivo-autumnal types of malarial organisms.

But although it is true that malaria is a disease with a definite symptomatology, and although this fact is acknowledged by the majority of able practitioners, nevertheless they are still unable to rid their minds of the old belief that it acts at times as a "humor" in the blood, and speak of patients as having a "touch of malaria." These patients, who have never had the disease, and have lived in climates free from it, are much to be pitied, for their cases are ill-studied, and as a result they are ill-treated. Only with syphilis can it be fairly compared in the multitude of effects which it is believed it may produce, and their long continuance, running over periods of ten years and more. "Touch of" is a term which most learned doctors carefully avoid using, except in this one disease—malaria; for in other cases to use it is a sign of ignorance; in almost all other maladies we speak of a "slight attack;" but a "touch of malaria" often means not that the patient has really had malaria, but has been in some way affected by a strange morbid entity, like foul air, or some other gaseous principle.

We also read of cases where it is reported that the patient was full of "malarial poison," as though the poison existed where the blood contained no organisms, or as though the poison could last indefinitely and not be eliminated from the body. There is no other poison that we know of with which this one can be compared. It reminds one of the tales of strange poisons used in by-gone times, which could be slowly but surely given to a person, and just as slowly and surely was his strength sapped, and finally he would die, and yet all evidence of poisoning would be lacking. The only difference is that such poisons could be manufactured at demand, whereas "malarial poison" is an entity unknown and not to be understood, but only conceived of as a deadly influence. In a late number of the *Boston Medical and Surgical Journal*, in an otherwise admirable article on the "Pulmonary Invalid in Colorado," there occurs the phrase "malarial stage" of phthisis, by which the author means an early stage of "debility, slight febrile movement, a quick pulse, and few or dubious signs on chest examination." We cannot help feeling that this is a very bad adjective to use in such connection, especially as it keeps up this idea about malaria, which should be got rid of, and that is its very vagueness as a disease; it is not vague, it is far more comprehensible than many other diseases which we think we understand all about.

With the idea of trying to group together the diseases or symptoms of disease, other than the typical ones, which may truly be caused by malaria, and with the hope that in this way some light may be thrown on this much-dreaded malady, I have carefully gone over the bibliography of malaria for the past twelve years, since the publication of Laveran's¹ book on *Paludism* in 1884, noting more especially the cases of malaria with rare symptomatology. All the references are taken from the *Index Medicus* of the Surgeon-General's Library at Washington, D. C. A fair comparison between malaria as seen in this country and abroad—more especially in Africa and Italy—is rendered somewhat difficult from the fact that for this country we have no comprehensive studies on the subject, since the differentiation of the organism has been accurately determined, except that of Thayer and Hewetson,² which deals only with the fevers met with in Baltimore, where the pernicious cases are rare.³ These latter are probably far more common further south in the United States, but as yet we know but very little about them as they appear here. Reasoning from analogy, all we can say is that, as the milder forms in this country correspond exactly with those seen elsewhere, and as the organisms of the pernicious cases are the prototypes

¹ Laveran: *Traité des fièvres palustres*, Paris, 1884.

² Thayer and Hewetson: "Malarial Fevers of Baltimore," *Johns Hopkins Hospital Reports*, 1895, v.

³ Valuable minor contributions to the study of malaria had previously been made by Osler, Councilman, and Dock.

of those seen abroad and the few pernicious cases very similar to those reported by foreigners, there is but little reason to doubt that our fevers are practically in all respects the counterpart of those seen abroad. The pernicious cases of Africa and the Roman campaign may be more severe in their effects than the majority of the same class of cases seen in this country, but till the fatal cases of fever seen in the South, many of which are probably falsely attributed to typhoid, are more carefully studied we can draw no definite conclusions.

Another class of fevers which we read much about at present in the journals are the so-called "hemorrhagic fevers," which occur in the Southern States. What these are we do not as yet know definitely. Whether they are caused by malaria, by typhoid, or by amœbic dysentery, or by some other protozoan infection, is not yet determined. Probably some cases will come under all the first three heads. However, in the *New York Medical Record*, August 8, 1896, several cases are reported of hemorrhagic fever, where the treatment was calomel and not quinine—where the author advises against quinine. The cases got well. If they were malaria, with such symptoms, they would, one may say definitely, not have recovered without quinine. But all this goes to show simply that all forms of fever in the South need to be more carefully studied than they have been in the past. It is this uncertainty which leads to much of the confusion about malaria. All we can say is that from a perusal of the foreign literature there is evidence that the pernicious cases are far more common and more pernicious than with us. Much of the misunderstanding about malaria at present depends on the fact that the blood in cases supposed to be malaria is not commonly examined; if this were regularly and faithfully done, the subject would at once be much cleared up. But a second difficulty, and almost as important a one, which acts as a stumbling-block to many practitioners, is the fact that they do not recognize that other fevers and diseases beside malaria may be associated with intermittent or daily chills, requiring a careful examination of the blood to discover the cause of these chills; and, therefore, they are apt to lay too much stress on the type of fever alone in differentiating between malaria and other diseases. It may be well here to call attention to the fact that the most benign forms of malaria—the tertian and quartan—are the really more characteristically intermittent forms, while the æstivo-autumnal form, which is the only one to give rise to pernicious cases, is more commonly associated with a steady fever, or an irregularly intermittent variety, though the fever in these cases is sometimes, but rarely, typically intermittent. In the pernicious cases the fever is almost always continuous, and shows no regular intermittent character. And yet, spite of this, many strange and rare conditions are attributed to malaria, because of their intermittent character, which, if regular, could only be attributable, as a general rule, to the

tertian or quartan fevers, which do not give rise to any such symptoms, as we know from the large number of cases reported by competent observers. If the conditions which are attributed to malaria are not regularly intermittent, then they may or may not be due to malaria, for other diseases will give rise to signs at times quite irregularly intermittent. Therefore, regular intermittency may help to confirm a diagnosis of malaria, but grave signs occurring with regular intermittency must be rare, and if due to malaria, must be dependent on the festivo-autumnal variety, and with but few exceptions should be seen only in the autumn and winter months, when this form of malaria is prevalent.

And a third difficulty arises from the curative effects of quinine; this drug without a doubt is a specific in malaria, but at the same time it is also an excellent tonic in many other conditions, and slight febrile attacks having no association with malaria may be readily controlled by it; many of the cases of so-called malaria are attributed to it solely because the disease showed an intermittent character and was favorably influenced by quinine. Now, these two factors alone—*i. e.*, the intermittency of the fever and the beneficial effects of quinine—are not sufficient upon which to make a diagnosis of malaria in a patient who has never had the disease nor lived in a malarious climate. They are two important factors; but without a study of the family and personal (past and present) history of the case too much stress should not be laid upon them, and no doubtful case should be accredited to malaria without a careful study of the blood. It must be granted that frequently the organism may not be found on the first examination; but where a case can be kept under observation for several days it is the exception and very rare not to find the organism at some time. There is much talk about “larvate” forms of malaria—*i. e.*, forms where the organism cannot be found; many of these are undoubtedly not cases of malaria at all, and many are not sufficiently studied; but there is a third and important group of cases, which have had malaria a short time previously, and where under treatment with quinine the organisms have entirely disappeared from the circulating blood, but whose symptoms—anaemia, cachexia, etc.—are undoubtedly due to the pre-existent malaria. To this last class only should the term “larvate” be applied. In a few dubious cases in private and hospital practice it may be justifiable to tap the spleen and examine the blood drawn from that organ to make a diagnosis certain. It is not a difficult procedure, and is only attended with risk in the case of a large soft spleen [in such cases puncture should not be done], or where there is some carelessness in tapping. However, this added means of diagnosis is very seldom needed, and only mentioned as a possibility for some exceptional cases.

In the paper by Thayer and Hewetson, twenty-six conditions, occurring altogether thirty-eight times in the 616 cases reported by them, are

noted as complications in malaria. Dr. J. M. Anders¹ in 1895 reported a "statistical study of the complications of malaria," collected from three of the Philadelphia hospitals between the years 1873 and 1894 inclusive. In 1780 cases he notes fifty-two conditions occurring altogether 191 times. In these fifty-two conditions there are a few which should rather be classified as symptoms, and in the whole 1780 cases there are undoubtedly a large number which are not malaria at all. But this makes but little difference in the point which I wish to bring out, that malaria is a disease which is frequently found associated with many others, and which does not prevent other maladies from occurring in conjunction with it, but which are in no wise dependent upon it, although by many falsely so attributed. Spite of this large number of possible complications, there is still a very large number of diseases and conditions definitely attributable to malaria, as compiled from the writings of various authors. This list includes cerebral and spinal diseases, affections of the eyes, ears, nose, lungs, heart, gastro-intestinal tract, liver, spleen, kidneys, genito-urinary organs, and peripheral nervous system. This is not all that I have found, and I shall mention others further on in my paper. I have not tabulated all the various papers I have studied, for many, from the imperfect description of the cases, are quite worthless, but I will give a few striking cases of so-called malaria reported by doctors in different countries. Pantzer,² for example, reports seven "rare" cases of "malarial intoxication;" in not one of these was the blood examined. Some of the cases had no fever, and in none is the condition of the spleen mentioned. Diagnosis was made simply on the grounds that the patients lived in a "malarious" climate and that they improved under quinine. Murray³ reports a case of so-called "malarial scurvy" and post-malar ulcer; here again there is no examination of the blood or spleen, and nothing said about fever. The author attributes these ulcers to malaria, as they are not apparently due to lack of vegetable diet; the natives call these ulcers "sanyak" or "sany-patik," which means literally arising from cold or chill. "Chill," unfortunately, is still an interchangeable term for malaria in the minds of many doctors. Colleville⁴ reports the following case: A furuncle appeared on the upper lip of a patient nine months to a year after last attack of malaria, and yet from the whole history of the case there is no apparent connection between the cause and result in this case except in the mind of the author. Treille⁵ relates a somewhat similar and equally unsatisfactory case of phlegmon on the neck; this phlegmon he speaks

¹ J. M. Anders: *Journal of the American Medical Association*, 1895, xxiv. pp. 916-920.

² H. O. Pantzer: *Transactions of the Indiana Medical Society*, Indianapolis, 1892.

³ R. D. Murray: *Indian Medical Gazette*, Calcutta, xxi.

⁴ M. Colleville: *France Méd.*, Paris, 1884, i.

⁵ A. Treille: *Gaz. Méd. de Nantes*, 1892-93, xi.

of as anthrax also. The patient had marked chills not affected by quinine. The author says that blood was drawn on several occasions, and different bodies characteristic of malaria were found; but the type is not mentioned. He says the microscopic and bacterioscopic examination of the pus from this phlegmon showed, beside leucocytes, a large proportion of malarial organisms—again the type is not mentioned—and the staphylococcus aureus in relatively small numbers. The patient recovered under Fowler's solution and an ointment of quinine—both excellent tonics in such a condition. The fact that the organism is said to have been found in the pus would certainly be most interesting could we believe it, and would be the first case on record in which this has occurred; but there is no reason for putting trust in the statement, and we are more willing to believe that red blood-cells or some other structural elements of the tissues were mistaken for the organism, as is so frequently done, and we only need to call attention to an article published in 1896 in the *New York Medical Record*, entitled "What is Malaria?" Treille states that he also believes one type of organism can change into another—of which there is absolutely no proof. Giura¹ recounts a case of leucocythæmia following malaria, where there was no examination of the blood made, either for counting the white cells or for the organism of malaria. And yet one more case, reported by Kirnison,² of gingival hemorrhage, due to malaria; the patient was a man, aged fifty-eight years, who when eighteen had what was supposed to be malaria. When twenty years old extraction of a tooth was followed by severe hemorrhage; eight years later he had a second gingival hemorrhage, apparently without any cause; then till the year 1869 he had hemorrhages tolerably frequently, first at regular intervals of four or five months, then less frequently, coming on only at a year's interval. In 1869 he had one, and then others in 1874, 1879, and 1884, regularly at five years' intervals. These hemorrhages usually came on at night in the months of July and August, and lasted for varying lengths of time up to sixteen days. Patient had no fever, and the bleeding was not controlled by quinine. Whatever may have been the cause of these hemorrhages, they were certainly not due to malaria of any type about which we know anything. One case, however, is reported by Bastianelli³ and Bignami, of chronic malaria, where the æstivo-autumnal organisms were found, and where there were severe cutaneous hemorrhages, also bleeding from the gums, ears, and nose. This is the only positive case I have found, and the simultaneous occurrence of the two conditions must be extremely rare. The question in such a case necessarily arises, whether there was not some other factor at work to cause

¹ A. Giura: *Gaz. Med. di Roma*, 1885, xi.

² E. Kirnison: *Gaz. hebdom. de Méd.*, Paris, 1884, 2 S. xxi.

³ Bastianelli and Bignami: *Bull. Soc. Lancet*, Roma, 1893, ix.-x.

the hemorrhages other than malaria. As I have mentioned above, "larvate" forms must be looked upon with doubt, especially when there is no examination of the blood, and the patient has neither chills nor fever, nor other diagnostic features of malaria. Intermittency, as in the case reported by Kirmisson, is absolutely no sign of malaria. Such cases as I have given only lead to confusion of the subject, and no case should be reported as due to malaria where the evidence is so feeble as that given above.

I have only studied the literature under the heading of "malaria," and it is very likely that if I had pursued the subject further and looked up diseases of special senses or organs, I might have been able to increase the list of affections said to be due to malaria or a malarious taint. Most of the material on which I depend is drawn from the Italian, French, and Spanish authors. The mass is large, but when we come to analyze it, it dwindles down rapidly, and we find that malaria is a much abused disease.

It is often hard to exactly differentiate existing conditions into symptoms directly associated with malaria and diseases consequent on malaria. Diseases may exist at the same time as the malaria, or may be induced by it; and only such conditions should be classified as symptoms as are the common conditions existing in malaria—for example, chills followed by fever, headache, and sweating, vomiting, epistaxis, herpes labialis, bronchitis, and albumin in the urine. All these occur sufficiently often to make them characteristic of malaria when a number are taken together. Many other conditions occur only in a small proportion of cases, and, while in a sense symptomatic of malaria, they cannot fairly be classed in the general symptomatology of this disease; such are some of the cerebral and spinal conditions to which I shall refer later. De Mello¹ gives the following long list of types under which pernicious malaria may occur. Cases may begin with symptoms

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Uterine colic,	Hæmaturia,	Gastric crises,
Cerebral hemorrhage,	Arthrodynia,	Laryngeal and vesical
Myelitis or meningitis,	Phonophobia,	spasms,
Hæmatemesis,	Hypergenesis,	Metroperitonitis,
Epistaxis,	Paralysis of sphincters,	Metro-ovarialgia,
Hæmoptysis,	Deafness,	Abortion,
Otorrhagia,	Prostatitis,	Retention of urine,
Metrorrhagia,	Orchitis,	Unconscious emission of
Parotitis,	Myodynia,	urine,
Amygdalitis,	Weakness of genital or-	Asphyxia,
Hemorrhagia,	gans,	Cystitis,
		Erythemas,

¹ V. de Mello : *Uniao Medica*, Rio de Janeiro, 1885.

and still more. Further, he classifies the cases into those with tracheo-, laryngo-, broncho-, pneumo-pleuretico manifestations; or the pneumorrhagic or hæmoptoic forms, and even pneumo-phynical. One other variety is the labio-glosso-estomato-pharyngeal. Undoubtedly some of the above-named conditions are symptomatic of malaria, or may occur in conjunction with it, simply as so-called complications, but are in no wise dependent upon it as a cause. Such a complex symptomatology leads only to confusion, which is most evident in the mind of the author, who concludes his article by the startling statement that yellow fever is only a graver form of acute malaria: "*le fièvre jaune n'est qu'une modalité plus grave de l'impaludisme aiguë.*" Weber¹ gives the following list:

Severe epistaxis,	Acute purulent urethritis,	Hæmatemesis,
Intestinal catarrh,	Apneumatoxis,	Abortion,
Neurasthenia,	Intermittent neuralgias,	Insanity.

Browne² mentions the following signs:

Metrorrhagia,	Iritis and corneo-iritis,	Neuralgic attacks,
Menorrhagia,	Neurosis (numbness) of	Sudden loss of consciousness.
Amenorrhœa.	limbs,	

Sbrana³ has the following list:

Orchitis,	Peripheral thrombosis,	Myocarditis.
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Another author⁴ in America mentions dropsy—general or partial—as symptomatic of malaria and also hepatic abscess. He says: "I have noticed several fatal cases of hepatic abscess after long-continued intermittents, which I attribute to chronic inflammation of that organ from intense congestion during the apyrexia of intermittents." Such is the conception of malaria as held by some authors in various parts of the world, and there is little wonder that the disease is so universally feared. But when we come to examine into the cases reported by these authors and others, we find but little method in their madness, and they cannot confirm their statements by actual and satisfactory proof. This long inventory is not a complete list of all the signs I have run across, and others will be mentioned in the discussion of various cases to be reported. I will now take up some of these signs more fully, and will show that there is little proof that malaria has anything to do with the majority of them. Of all the various uterine manifestations noted above, I have been unable to find a single case reported in detail where there was any evidence of the disturbance being due to malaria. It is possible that abor-

¹ L. Weber: Medical Record, New York, 1885.

² R. H. Browne: British Medical Journal, London, 1885, ii.

³ F. Sbrana: L'ufficiale sanitario Rivista d'igiene di med. prae Napoli, 1895, viii 4.

⁴ Southern Clinice, Richmond, Va., 1885, viii.

tion might be produced in some cases of exceptional severity, but I have come across no report to confirm this idea. To take up the consideration of all the signs mentioned above would be useless, for in many instances they are simply mentioned as beliefs of the author writing, and no cases are given in proof.

It may be as well here to say a few words about the possibility of congenital malaria, which is mentioned by some authors. Cina¹ reports such a case, and in the various treatises on children's diseases (*ex. Bouchut, Steiner, Gerhardt*) we find this subject referred to, but there are as yet no absolutely positive cases on record. Two possibilities exist—one that the fœtus *in utero* should, if the mother have malaria, suffer from chills at the time when the organisms segment, by the absorption of toxius which it is believed are set free at the time of segmentation, and which are rapidly and easily taken up into the system, and so give rise to chills; but simple absorption of the toxin would not account for the child having chills after birth, unless it was newly infected. The other possibility which would give rise to chills after birth, of the same general character as the mother's, would depend on the presence of lesions in the placenta, allowing direct communication of the mother's blood with that of the fœtus, and so transference of the organism into the fœtus.

As I have just mentioned the uterine manifestations, I will now take up those referable to the male genital organs. Weber, as above mentioned, reports two cases of acute purulent urethritis and says, "both were entirely free from gonorrhœa;" now neither pus nor blood was examined in these cases, and evidence is entirely wanting that the result was due to the attributed cause. Sbrana, Charvot,² Coronado,³ Sutcliffe,⁴ and Lardier⁵ all report cases of orchitis due, as they say, to malaria. Sbrana believes such cases exist, that they are not due to parotitis or gonorrhœa, but gives no new cases. The longest and most thorough paper is by Charvot, who refers to the works on this subject by Gerard, Drago, Maurel, Bertholon, and Schmidt. He reports six cases, in none of which was the blood examined. In Cases I. and II. the patients were supposed to have malaria at the time when orchitis was present; in Case III. the patient had had slight attacks of malaria a year previously; in Case IV. attack followed malaria after about two years; in Case V. it followed on sciatica due to fatigue and cold, and the patient had had malaria some six months previously; in Case VI. the patient had had gonorrhœa, but it was quite cured. The other five patients all deny having had gonor-

¹ F. Cina: *Pediatria*, Napoli, 1893, i.

² Charvot: *Rev. de Chir.*, Paris, 1883, viii.

³ T. Coronado: *Cron. Méd. quir. de la Habana*, 1889, xv.

⁴ Sutcliffe: *India Medical Gazette*, Calcutta, 1895, xxx. No. 4.

⁵ Lardier: *Bull. méd. de Vosges*, Rambervillers, 1887 88, ii.

rhœa, and there was no urethral discharge in any one of the six cases.

The author says that the diagnosis is to be made on the brisk onset; that the tumor is very painful, and that the patient may have fever running as high as 40° C. Both testicle and epididymis are involved, and the tumor is quite smooth. The acute period is shorter than in gonorrhœa. The tumefaction and induration of the epididymis do not last long. There is only slight effusion into the tunica vaginalis. The pain is usually limited to the serotal sac, but may pass up the cord into thigh and abdomen. The very acute period lasts but three or four days. The prognosis is good, though the resolution of the tumor is slow, and takes from three to six weeks, and there may be some atrophy of the testicle. The treatment is by the use of quinine, under which the acute period is shortened, and the feverish, congestive, and painful symptoms rapidly disappear. There is an intermittent type of these forms of orchitis where there is periodic swelling and reduction of the tumor. Coronado refers to this article by Chareot, and gives a general similar description. He adds seven cases to the above; in none was there any urethral discharge and in none was the blood examined. He says the inguinal glands are at times enlarged and tender. Lardier mentions the affection, but says little about it. Sutcliffe gives the history of a man, aged forty-two years, who showed no evidence of gonorrhœa nor mumps. He first had swelling of one testicle, later of another, but the swelling did not last long. The blood was not examined.

Such is all the evidence on hand of an orchitis dependent on malaria, and it would appear to be insufficient. The fact that there was no urethral discharge in all these cases is interesting. We do not yet understand the relationship between orchitis and parotitis—there may be a similar one between orchitis and malaria; but there is one noteworthy fact in connection with these cases and other strange cases, that the authors of them are not the men who have pursued the study of malaria most diligently and under the best conditions, such as Laveran, Marchiafava, Bignami, Celli, Golgi, Thayer and Hewetson, and others, and no one of these investigators has ever, so far as I have been able to find out, come across any such cases in the many thousands they have studied. Peptonuria and albuminuria occur in a large number of cases of malaria, as in other diseases associated with fever, and there is no need for going into detail about these conditions. Acute hemorrhagic nephritis directly dependent on malaria, where the blood has been examined with positive findings, has been noted by a number of authors, and there is no doubt that it occurs, although the condition has been attributed to the effects of quinine given for its therapeutic effects in very large doses. But well-authenticated cases are reported where no quinine had been given when the condition was first discovered.

Another cause for the hemorrhagic nephritis should here be mentioned, and that is the possibility of a bacterial infection being combined with the malarial. This condition was found in a case of nephritis complicating malaria, reported by Barker,¹ and which I shall consider more fully below. In this connection a word must be said about the occurrence of hæmoglobinuria: in the 616 cases carefully studied by Thayer and Hewetson, this sign was not noted once; and Manson² says also that "it is not known in our colonies in the Malay country," and Stewart,³ who gives a doubtful case, says it does not occur in Borneo. However, Pace⁴ does give a case where this condition occurred associated with æstivo-autumnal malaria; the organisms were found in the blood when the patient was suffering from methæmoglobinuria. Chvostek,⁵ in a short treatise on the nature of paroxysmal hæmoglobinuria, refers to malaria as a cause, but gives no cases. There would seem to be but little question that malaria may rarely be the cause of this affection, but it is probable also, from the fact that hæmoglobinuria is paroxysmal and usually associated with chills, that malaria has very frequently been falsely taken as the cause. Kelsch and Kiener⁶ say that one-third of the deaths from malaria in parts of Africa are probably due to this condition, but this statement is not based on statistics, and is, to say the least, very doubtful. Diabetes and polyuria have been attributed by some authors (Mossé⁷) to malaria, but there is no case to be found where the connection between the two diseases is marked. Laveran does not believe that diabetes is due to malaria. He says there is not sufficient evidence, and that what evidence there is does not support the theory. I have come across one case where amyloid degeneration of the liver, spleen, and kidney was supposed to be due to chronic malaria; but except for the existence of chills and that the man had been in Tunis, where malaria prevails, there seems to be no logical connection between the pathological findings and the history of the patient before death. Amyloid disease has often been attributed to malaria (chronic), especially by writers before the discovery of the malarial parasite, but I believe no evidence exists which proves that malaria of any type ever produces this affection. Pope⁸ says anasarca is common in cases of chronic malaria, though it may occur in other types of malarial fever. But he gives no cases and mentions no examinations of the blood. Dropsy, general or partial, I have noted above as mentioned by an

1 L. F. Barker: Johns Hopkins Hospital Reports, 1895, v.

2 Manson: British Medical Journal, 1896.

3 Stewart: British Medical Journal, April 11, 1896.

4 D. Pace: *Gior. internaz. de. sc. med. Napoli*, 1894, n. s., xvi.

5 F. Chvostek: "Ueber das Wesen Paroxysmalen Hæmoglobinurie," *Leipzig*, 1894.

6 Kelsch and Kiener: *Traité des Maladies des Pays chauds*, Paris, 1891.

7 E. Mossé: *Gaz. hebdomadaire de sc. Méd. de Montpellier*, 1888, x.

8 G. I. Pope: *American Practitioner and News*, Louisville, 1887, n. s. iii.

American author writing from Virginia. In cases of malaria which have existed for some time, and where the anæmia is well marked, it is not uncommon to find slight œdema about the ankles, but general anasarca is rare. I would here refer to three cases which I had the opportunity of observing a year ago in the Dispensary of the Emergency Hospital of this city, and I take pleasure here in thanking Dr. George Byrd Harrison, of Washington, for permission to publish these cases.

The first is that of a man, aged forty-three years; white. He came to the hospital complaining of swollen feet. His past history was negative; had never had chills before present illness, nor did he remember ever having been ill before.

Present history. October 22, 1895. Two weeks ago his chills stopped, under use of quinine. He had had ten chills previously on consecutive days; after chills had some fever; was thirsty and felt weak. Did not notice about headaches. Had pains in his bones. Did not vomit. Since last chill has felt well. Three nights ago (October 19th) noticed feet were swollen about ankles; next day more so, and yesterday could not get shoes on. His general condition seems good, except that he has had two or three loose stools for the past ten days. There is puffiness about the eyes, and he looks like a man suffering from Bright's disease. Pulse is full and regular, tension not increased. He is anæmic and has a pasty look. Tongue dry, with slight brownish coat. No history of exposure to wet or cold; feet have not been wet. He is a trunk-maker. No blue line on gums. Feet and legs much swollen, pitting on pressure along whole length of tibiæ. Says urine has not been increased, but looks reddish at times. Urine passed when patient was seen was entirely negative. Blood showed many crescents (æstivo-autumnal malaria). The patient was sent to the hospital and soon recovered on rest and tonics (ext. iron and quinine).

The second case, which I will not report in full, is essentially similar in every respect. The man had marked œdema of the legs, and could not get his boots on. The urine was negative. His blood showed crescents and preflagellating forms of malarial organisms.

The third case occurred in a mulatto girl, and in no wise differs from the two related. The urine was negative, and her blood showed crescents.

Only in the first case is the whole history satisfactory; no other cause for condition could be found. In the second the man disappeared from view and no physical examination was made. In the third no physical examination was made, but the patient improved rapidly when put on quinine regularly.

I am, however, inclined to attribute the anasarca in all three cases to the malaria alone, and that of the æstivo-autumnal variety, although it must be admitted that factors other than malaria, though not recognized, may have played a part. A point of some interest here is that the anæmia seems to be greatest in the tertian variety of malaria, since the destruction of the red blood-cells in this form is more rapid and extensive than in the ordinary attacks of æstivo-autumnal fever. The degree of anæmia in these cases from ocular evidence alone—which, however,

is often delusive—was not marked, and unfortunately no blood-count was made in any of the three cases. How to explain the anasarca in them is not very clear. In the first two cases the feet were so swollen that the patients could not get on their boots, but wore large, loose slippers; in the third case the girl could not button her boots over her instep. In this connection, however, I would call attention to the case reported by Barker: "Case D.—Double tertian malarial infection, associated with general streptococcus infection; symptoms of an acute nephritis with general anasarca manifested during life." Although this case does not accurately correspond with those given above, yet it is possible that in the three patients whose history I have related there may have been a mild streptococcus invasion; a single examination of the urine is not sufficient to prove that the kidneys were in an absolutely normal condition. It is this possibility which calls for the remark made above in reference to these cases, that factors other than malaria, though not recognized (and possibly not recognizable) may have played a part. It is unnecessary to give Barker's case in detail. One of the interesting points in it is that by accident the blood was not examined during life, and the condition of hemorrhagic nephritis was, therefore, not attributed to malaria. It was only at autopsy that the true cause for the trouble was discovered. In his case the anasarca may justly be attributed to the streptococcus infection, whereas in the three cases reported by myself there must remain a doubt as to the cause of the anasarca. Barker says "the bacterial infections which may be associated with malaria are numerous," but that "cases of general streptococcus infection, such as the one described under the head of Case D, are undoubtedly rare."

The eye-symptoms in malaria have been much observed, and there are several long papers descriptive of these, but there is little confirmatory evidence of the various affections described as being due to malaria. We have papers by De Schweinitz,¹ Sulzer,² Sacchi,³ Hewelke,⁴ Seljok,⁵ and Hall.⁶ De Schweinitz reviews the literature and gives a long list of ocular complications; in only one case mentioned by him—a case of bilateral hemianopia—were organisms found. The other authors, with the exception of Sulzer, report one case each of ocular trouble supposedly due to malaria—one of functional blindness, one of iritis plastica, one of mydriasis, and one of hypersensitiveness of the optic nerve. Sulzer, who had wide and favorable opportunity for studying the eye-symptoms in a number of soldiers in Borneo, reports no cases where malarial organisms were found in the blood at the time the eye-

¹ De Schweinitz: Medical News, Philadelphia, 1890, lvi.

² Sulzer: Archiv. d'Ophth., Paris, 1890, x.

³ E. Sacchi: Gaz. d. osp., Milano, 1887, viii.

⁴ O. Hewelke: Kron. lek. Warszawa, 1889, x.

⁵ I. Seljok: Russk. Med., St. Petersburg, 1889, vii.

⁶ W. T. Hall: Peoria M. Month, 1888-89, ix.

symptoms existed. He mentions the following conditions as occurring and due to malaria :

Intermittent amaurosis,	Sudden and persistent blindness,	Retino-choroiditis,
Optic neuritis,	Periodic blue vision,	Purulent choroiditis,
Perineuritis,	Scôtoma,	Photophobia.
Atrophy of optic nerve,	Retinal hemorrhages,	

He classifies the conditions as follows :

1. Chronic optic neuritis with melanosis of papilla in severe forms.
2. Diffuse infiltration of vitreous body.
3. Multiple peripheral punctiform hemorrhages of the retina.
4. Sudden and persistent amaurosis.

These are the severe forms, and a second class of less severe types are as follows :

1. Amaurosis and periodic amblyopia without ocular lesions.
2. Diffuse lesions of the fundus of the eye which predispose to macular affections.
3. Large peripapillary and macular retinal hemorrhages.

He says there is a certain distinct color of the retina which is diagnostic of malaria; this is a reddish-gray or even black ("une teinte rouge grisâtre et même noirâtre"). This coloration is due to the presence of pigmented leucocytes in the enlarged capillary vessels of the papilla—that is to say, to a true melanosis of the organ. Such a condition is conceivable, as we know by proof that the cerebral capillaries may contain pigmented leucocytes and malarial organisms; but the actual proof is wanting in this case, and so the whole matter stands. These eye-symptoms are certainly most interesting, but require further study for their elucidation. Laveran says amblyopia may be due to capillary emboli of pigment-bearing leucocytes.

Much has been written about malaria as a causative factor in pneumonia, but there is not a single case on record which stands proof. Marchiafava and Guarneri¹ report a case, with autopsy, where the two diseases existed at the same time; but at the autopsy the diplococci pneumoniæ were found in the lung, and the part played by the malaria was possibly simply that of weakening the constitution of the patients. Martin² reports another case with autopsy—not quite so conclusive, for there was no bacteriological examination, but there were no signs that the pneumonia was in any way affected by the malaria. Cerri,³ in a short article on this subject in which he gives no cases, concludes that a

¹ Marchiafava and Guarneri: Bull. d. r. acad. med. di Roma, 1888-89, x.

² Martin: Montreal Medical Journal, 1892-93, xxi.

³ V. Cerri: Gazz. d. osp., Milano, 1893, xvi.

pneumonia that is neither frank in its onset, course, nor symptomatology, may be due to malaria; that it runs its course in four or five days, presenting an aggravation on the third; that it has an adynamic character; that quinine is an excellent remedy and shortens the course of the disease. And he believes it due to malaria because of its abnormal course, because it sets in after the malarial fever has begun, and because of the efficiency of quinine. In reply, all that need be said is that the best observers, Laveran, Marchiafava, Osler, Howard,¹ etc., do not agree with him. On the subject of the association of malaria and pneumonia, Laveran says that the pneumonia in those suffering from the cachexia resulting from malaria, or simply in anæmic patients weakened by one or more attacks of intermittent fever, may not be *franc*, but may rather resemble the form seen in old people. It may be prolonged and the resolution very slow. He says "there is no such thing as a malarial intermittent pneumonia, nor a remittent pneumonic fever, nor a pernicious pneumonic fever. That where there would seem to be a malarial intermittent pneumonia it is only due to pulmonary congestion observed at each attack of the intermittent fever." Of the association of malaria with bronchitis and broncho-pneumonia, little need be said. "They are frequent complications of malaria, and probably may be due to any of the pyogenic organisms" (Barker). That they are such common complications is not to be wondered at when we know of the unhygienic lives led by many of those suffering with malaria; how a large number of our dispensary patients sleep out-of-doors in malarial localities, and are exposed to damp and wet. Tuberculosis and malaria may be associated, as in a case reported by Leidy,² but although Anders (*loc. cit.*) believes malaria predisposes to this disease, there is no evidence of such being the case, and there is still less evidence that pleurisy may be due to malaria.

In close association with the lung symptoms come those associated with the heart. Many authors believe that malaria may cause definite heart lesions, but again there is not a single case reported which is of convincing evidence, and as negative proof against this theory Laveran and the other authorities on malaria hold the opposite view. Laveran says that in all the patients with malaria whom he examined, he never saw the signs of a pericarditis nor an endocarditis; only once at an autopsy did he find the signs of an old endocarditis. Toralbo,³ in an article dealing with this subject (he gives no cases), mentions the four following conditions as dependent on malaria:

¹ It is interesting to note that Howard's work was written in 1859, and had, as Barker says, "an important influence, and still merits careful reading." When we consider that it was written without any of that light which the investigators of the past ten years have thrown on this subject, the conclusions he came to are remarkable and show wonderfully careful observation on the part of the author.

² J. Leidy, Jr.: Transactions of the Pathological Society of Philadelphia, 1890-91, xv.

³ L. Toralbo: Osservatore, Torino, 1890, xli.

1. Dilatation of heart.
2. Atheromatous changes.
3. Mitral insufficiency.
4. Fatty degeneration of myocardium.

Sbrana (*loc. cit.*) reports a case of "myocardite palustre" in a man who had had intermittent fever and later developed a large heart: but the history of the case does not prove his conclusion that the cardiac lesion was dependent on the fever.

Law¹ believes definite heart disease to be due to malaria, where the proof is only that the patients have lived in a malarious country. Agreda,² Smith,³ and Saussol⁴ all report unsatisfactory cases, where the evidence does not even exist that the patient had malaria. Moscato⁵ mentions a case of a man who had had neither rheumatism, acute or chronic, nor any infectious disease like typhoid, nor erysipelas, and who had not abused alcohol, tea, or tobacco. For about five months in the year before he was seen by the author he had had malaria; he now showed signs of mitral insufficiency, hypertrophy of heart, with œdema and albumin. His spleen was enlarged. No examination of blood. This is the most convincing case that I have found, but it is by no means sure that the heart lesion here was dependent on malaria. Raunzier⁶ finds functional murmurs frequently in cases affected with malaria. They are usually systolic in time, and situated at the apex. He attributes them to the action of the poison on the muscles of the valves. We can readily believe in these functional murmurs, but would rather attribute them to the anemia, which is such a marked symptom in malaria, as we attribute them to the same cause in chlorosis.

Sbrana (*loc. cit.*), Chastang,⁷ Ragazzi,⁸ and others all mention cases of phlebitis following malaria. The best of these is that reported by Ragazzi, though here again no examination of the blood was made. The patient was a male, aged twenty-three years. He had been sick in a hospital for seventy-seven days, with malaria (daily chills); then he left, cured. Phlebitis of right leg developed a week later. Certainly the long time which he was sick is against the man having had malaria; but if it was malaria it does not seem at all unlikely that a phlebitis might result as a consequence of the debilitated condition in which the patient would have been left. The other cases are less convincing than this one.

¹ Law: British Guiana Med. Ann., Demerara, 1892.

² F. Agreda: Rev. de méd. y cirug. práct., Madrid, 1891, xxviii.

³ A. H. Smith: New York Medical Record, 1885 and 1886.

⁴ Saussol: Gaz. hebdom. de sc. méd. de Montpel., 1886, viii.

⁵ P. Moscato: Morgagni, Milano, 1895, xxxvii.

⁶ G. Raunzier: Rev. de méd., Paris, 1890, x.

⁷ Chastang: Archiv. de méd. nav., Paris, 1895, lxiii.

⁸ G. Ragazzi: Gaz. med. lomb., Milano, 1894, lxiil.

In considering the vascular disturbances, it may be as well to add a word here on Raynaud's disease, which by some has been attributed to malaria. On this point Laveran says that he believed that the disease can only be indirectly due to malaria which augments the sensibility to cold and exaggerates the reflex action of the spinal cord on the vaso-motor system. Gangrene may be directly due to malaria, he says, as a result of thrombosis, but it is still an open question.

Intermittent swelling of the thyroid gland, intermittent torticollis, purpura hæmorrhagica, and angina, as well as other strange conditions, have been noted as being due to malaria, but it is not worth while to spend any time on them, as they are reported but very rarely, and the cases are not in any manner convincing.

I will now finally take up the two most interesting groups of conditions on which most has been written, and for which we have the best confirmatory evidence: first, the gastro-intestinal signs or symptoms, and, secondly and lastly, the nervous, including both the central and the peripheral nervous system.

Severe gastro-intestinal disturbances are common in the pernicious form of malarial fever, by which is meant that form where the æstivo-autumnal organisms are found in the blood. There is conclusive evidence to be found in the works and papers of Laveran (*loc. cit.*), Marchiafava, Bignami and Bastianelli, and others. On this point Laveran says he has seen and relates cases, giving the type of organism found in each, where the symptoms resembled typhoid fever, or where they were choleric form in character; others with gastralgia, or with bilious vomiting and jaundice, and, still more rare, a few cases with diaphoretic and convulsive symptoms or with bilious fever and hæmaturia. Marchiafava and Bignami¹ report cases with choleric form symptoms. Profuse diarrhœa, vomiting, aphonia, and all the signs of an acute intestinal catarrh have been noted by Bignami and Bastianelli.² In autopsies they have found the mucosa of stomach and intestine swollen, intensely hyperæmic, œdematous, and covered with scattered punctiform hemorrhages of a red-brown color, and with the vessels thrombosed and full of organisms. There existed small superficial necroses and a secondary pericellular infiltration. Laveran in one case of pernicious fever found the peritoneum studded with minute hemorrhages. Marchiafava,³ in an interesting paper, says that among the pernicious fevers of the æstivo-autumnal variety of the Roman campagna there is a gastro-intestinal type, where the parasites accumulate in the capillaries of the mucous membrane of the intestine, and that the symptoms produced are like

¹ Marchiafava and Bignami: Bull. d. r. acad. Med. di Roma, 1892, xviii.

² Bignami and Bastianelli: Lavori del., III. Cong. del. Soc. Mal. di med. intern., Roma, 1890.

³ Marchiafava: Atti di XI. Cong. med. internaz., Roma, 1891, ii.

those of cholera: vomiting, abdominal pain, frequent and copious diarrhoea, cyanosis, aphonia, coldness, and singultus. In the diarrhoea, which contains blood, the parasite may be found. He says that the cases may be mistaken for cholera, and that in case of death the diagnosis is to be made from the pathological findings, which are dependent on the presence of the organisms and the color of the mucous membrane caused by them.

Of the above conditions there can be no rational doubt, since the cases are reported by authorities, and in all the blood examination has proved the existence of malaria.¹ There has been much discussion in the past on the so-called typho-malarial fevers. As above described there may be cases of malaria with typhoidal symptoms, and true typhoid, though rarely, may occur coincidently with malaria, but there is no other form of fever which justifies the name typho-malarial. The fever is either malaria or typhoid, or typhoid with malaria, or neither. But there is no half-way form where the former may turn into the latter, or *vice versa*, and the term and all ideas associated with it should be entirely discarded, since all or any proof is wanting of its existence. Garnier,² in a long thesis, where the cases are reported without examination of the blood, gives an account of the gastro-intestinal symptoms of malaria. His cases are not convincing, and may some of them have been dysentery—ordinary or of amœbic origin—and others may have been typhoid. Amœbic dysentery may be associated with malaria in just the same way as typhoid, as is typified by one case reported by Thayer and Hewetson. Barker says, "concerning protozoan infections concurrent with malaria little is known." Lardier³ reports cases of intermittent diarrhoea after gestation, which he attributes, without sufficient proof, to malaria. Reyes,⁴ likewise, without confirmatory evidence in the blood, gives account of several cases where the most prominent symptom was a pseudo-intestinal occlusion. He calls them, and fairly so, "rare" cases of pernicious fever. Pensuti⁵ describes a case of primary atrophy of the mucous membrane of the intestine. The patient was in the hospital for nearly three months, and suffered much from vomiting and diarrhoea. The spleen was not enlarged, the blood was not examined, and quinine had no effect on the course of disease. At autopsy the atrophy was most marked about the ileo-cæcal valve. He attributes the condition to malaria, but it would seem reasonable to doubt it. The intestinal symptoms of malaria in pernicious fevers are well marked, and

¹ An interesting case (Case B), with "grave abdominal symptoms," is to be found in Barker's paper; it occurred in Dr. Osler's clinic. It is also reported as one of the fatal pernicious cases in Thayer and Hewetson's treatise.

² J. A. V. A. Garnier: Thèse, Bordeaux, 1888.

³ Lardier: Gaz. hebdomadaire de sc. méd. de Montpel., 1888, II.

⁴ A. W. Reyes: Cron. Med. quincenal de la Habana, 1888, xlv.

⁵ V. Pensuti: Gaz. med. di Roma, 1893, xlx.

with necessary study and precaution are readily to be differentiated from those caused by other diseases.

Although I do not mean to take up the pathological findings in cases of malaria in detail, yet something must be said here on the question of cirrhosis as due to this disease. Much has been written on this point, and the best review of the present knowledge of this condition is to be found in Barker's article, from which I shall quote directly. He says: "Even in the early descriptions of malaria the important influence of the disease as a causative factor in the production of chronic interstitial inflammations of some of the internal organs, and especially of the liver and kidneys, is mentioned. . . . On the other hand, by not a few authors, the possibility of cirrhotic processes being due to malaria has been stoutly denied. It has been justly claimed that in many of the cases reported as instances of chronic inflammation due to malaria insufficient attention has been paid to the possible responsibility of other etiological factors, such as alcoholism, syphilis, and tuberculosis. Dr. Osler has particularly pointed out the difficulty of saying, in a given case of cirrhosis of the liver or kidneys, that malaria has been the cause, and in his experience the association of malaria with cirrhosis has been very uncommon. Dr. Welch has seen only one case of malarial cirrhosis of the liver in New York, and that was in an Algerian. The foregoing study has, however, convinced me that there are conditions present in malaria which are generally recognized as being capable of giving rise to chronic fibroid processes, and it would be strange did the latter not occur more or less frequently. Bignami, in a very careful study of chronic malarial cases in Italy, has come to a similar conclusion, and traces with much acumen the chain of events from the onset of an acute malarial infection to the development of a cirrhotic process. A careful consideration of the various phenomena associated with acute malaria will show that there are many ways in which a chronic intestinal inflammation could arise. Thus, looking upon the chronic interstitial inflammations as being due most often to a primary degeneration of certain of the tissue elements, the new growth of fibrous tissues being secondary, we can think of many possible causes of the former. Thus, the profound changes in the character of the blood-serum consequent upon the alteration and destruction of large numbers of red corpuscles and leucocytes, the intermittent hyperæmia in the viscera, the setting free of the malarial pigment, and the accumulation of the latter in the cells and tissues, the multiple capillary thromboses which sometimes occur, the disturbances of digestion in many of the cases, the areas of necrotic cells which can be demonstrated in liver, spleen, and kidneys; these are sufficient to convince one of the existence of many possible injurious influences." Barker then proceeds to elaborate these different causes, and from his careful study there is no other conclusion to be

drawn than that malaria may produce cirrhotic alterations in the internal organs in some cases, not always, but in a sufficient number to leave no doubt that the cause and effect are here intimately connected.

In conclusion, I will briefly describe the nervous symptoms, for which we have as good proof as for the gastro-intestinal, proof dependent not on ideas alone, but on facts corroborated by examinations of the blood, and reported by trustworthy observers.

Marchiafava and Bignami classify a number of pernicious cases as follows :

1. Those with cerebral and bulbar symptoms.
2. Those with irritative cerebral symptoms (like meningitis).
3. Those with eclamptic symptoms.
4. Those with hemiplegic symptoms.
5. Those with hemorrhagic symptoms.
6. Those with choleric form symptoms.
7. Those with comatose and soporose symptoms.
8. Those with delirium.

Laveran has also noted cases with sopor, coma, and delirium, and others with oppression and dyspnoea not apparently due to any lesion of the respiratory organs. He says "an apoplectic form has been described; there is no example, I believe, in which an individual healthy up to the time when he is attacked, falls suddenly into a state of coma due to malaria, like an individual attacked with cerebral hemorrhage; almost always the comatose attack is preceded by simpler attacks, and the attacks which are to develop into coma always begin as simple attacks; the temperature goes up with or without an initial chill, there is headache, general malaise, etc." Marchiafava, in speaking of the pernicious forms of the Roman campagna, says that the cerebral forms prevail—that is, those with soporose and comatose symptoms; then in order given those with delirium, with bulbar, convulsive, hemiplegic, and tetanic symptoms. Sacchi has a long article on the paralyses following or due to malaria; but his cases are not confirmed by blood examinations. He classifies them into three sorts :

1. Those coming on during ordinary intermittent fever.
2. Those following pernicious attacks.
3. Those resulting from chronic malaria.

He says they may take various types : aphasia, hemiplegia, paraplegia, partial anæsthesia, and disturbances of vision, of hearing, and of the other sensory organs. He attributes them to pigmented capillary emboli. Undoubtedly all these signs may occur, but it is very questionable whether they are ever seen in his first class of cases—*i. e.*, those of ordinary intermittent fever. It is more difficult to speak definitely as to the possibility of such conditions resulting from chronic malaria, but it seems highly unlikely that they should. Bastianelli and Bignami have noted

disturbances in innervation of the pupils in many cases, the right being larger than the left, or *vice versa*. Changes may occur during the day or night. Also that there is diminution, either bilateral or unilateral, in the innervation of the facial nerve, and the tonus of this nerve is very commonly lessened. They think that the irritative are more common than the paralytic symptoms, and have frequently observed excessive hyperæsthesia of the muscles. They report a case with bulbar symptoms, where the malarial organisms were found in the blood, and where the signs all disappeared under treatment with quinine. In an autopsy they found hemorrhages containing the organisms, in the white substance of both hemispheres and of the medulla oblongata, and also thrombosed cerebral vessels. Marchiafava¹ reports a case, with autopsy, of pernicious malarial fever, which during life had presented bulbar symptoms.

There were degenerative changes found in the cells of the medulla oblongata, due to stasis and thromboses of the capillary vessels, in which were found the organisms.

Torti² reports two very interesting cases where there were symptoms of multiple sclerosis. Both were cured by quinine, and in neither case was there evidence of any other disease like syphilis, nor had there been any abuse of alcohol or tobacco. Hysteria may very closely simulate multiple sclerosis, and it would in this way be possible to explain these two cases as being hysterical in nature. Not that they did not have malaria—for the blood examination proved that conclusively—but that the patients, being possibly of a nervous temperament, exhibited the effects of their disease in this strange form. Bonami³ has noted hemiplegia, convulsions, and transitory aphasia in cases attributed by him to malaria, of which the evidence is insufficient. Santo-Souza⁴ relates a case of some importance, however without any blood examination. The case was of a man, aged twenty-five years, who apparently had severe malarial fever; in his second attack he had persistent paraplegia with paresis of the upper limbs. The spleen was enlarged, and the patient had high fever. He died, but there was no autopsy.

Moscato⁵ has a long article on the multiple localizations of malaria on the central nervous system; sixty-four cases are badly reported, and furnish insufficient evidence for his theories. He gives a long list with the greatest variety of mental symptoms; in fact, there is hardly a possible brain symptom omitted. Though there may be much truth in his ideas, as we know from the more exact cases reported by others, yet he

¹ Marchiafava: *Lavori del III. Cong. del. soc. ital. di med. intern.*, Roma, 1890.

² A. Torti: *Riforma med.* Napoli, 1891, xii.

³ E. Bonami: *Journal de med. de l'ouest*, Nantes, 1887.

⁴ J. L. de Santo-Souza: *Gaz. med. da Bahia*, 1890-91, 1 S., i.

⁵ P. Moscato: *Morgagni*, Milano, 1890, xxxii.

carries his theories too far to be reasonable. Wolfe,¹ Norwine,² Oxford,³ Holt,⁴ Morini,⁵ and Hurd⁶ individually give cases of apoplexy and insanity, chorea, trismus, malaria simulating meningitis, and an epileptic attack with aphasia and paralysis of right facial nerve, and various paralyses. None of them show that malaria was the actual cause.

Combemale⁷ thinks there is no doubt that neuritis may be due to malaria, although Laveran, Weir Mitchell, and others do not believe in it. But he does, on the analogy of its causing such a variety of cerebral symptoms. He gives one case to confirm his theory, which is worse than if he had reported none. An officer who had been in Africa in 1865, and had had chills off and on for ten years, developed polyneuritis in 1890. He had had no chills since 1876. The blood was not examined, and quinine made him worse.

Jourdan⁸ also reports a case of peripheral neuritis, which he attributes to malaria; but again there is not sufficient proof to make it at all certain. Teissier⁹ reports two cases where the nervous symptoms came on a long time after the patients had had malaria; they add no weight to the theory that malaria may cause such conditions. Of neuralgia Laveran says that in those cases which he had observed, the pains had almost always existed previously to the chills, and thinks when the pains occurred in conjunction with malaria, that they were due to the associated anæmia. He says neuralgia may be intermittent, and cured by quinine without being due to malaria. Speaking of paralyses, he says they may be either transitory or persistent, the transitory being directly due to the malaria, coming on with the attacks and cured by quinine. The persistent paralyses are more common than the transitory, but their etiological relation to malaria is less clear and in many cases more difficult to determine; hemiplegia is the most common form. He saw only two cases, and was not convinced that they were due to malaria; one patient had had syphilis. They may be due to thromboses, which do not clear up, and which cause softening, while the transitory form may be a result of small hemorrhages.

In making a short review of what has gone before, there are several deductions which can be drawn: first and foremost, that malaria is not the cause of so many evils as are attributed to it; secondly, that its favorite seats of attack after the blood and blood-making organs are the

¹ S. Wolfe: Medical and Surgical Reporter, Philadelphia, 1888, lix.

² J. J. Norwine: Therapeutic Gazette, Detroit, 1885, 3 S. II.

³ E. Oxford: Gac. Med. de Caracas. Ann., 3 No., xl.

⁴ L. E. Holt: Archives of Pediatrics, Philadelphia, 1887, 1v.

⁵ D. Morini: Raccoglitori med. Forti., 1891, 5 S. xi.

⁶ A. W. Hurd: Buffalo Medical and Surgical Journal, 1888-89, xxviii.

⁷ Combemale: Progrès Médical, Paris, 1893, 2 S. xvi.

⁸ Jourdan: Archives de médecine et de pharmacie militaire, Paris, 1891.

⁹ Teissier: Bull. méd., Paris, 1891.

gastro-intestinal and the central nervous systems, and that other organs or systems are but rarely affected; thirdly, and not least important, that the cases supposed to be malaria should in the future be more carefully studied, and that hereafter it should not be given as a cause of existing evils without sufficient and abundant proof. If the blood cannot be examined then only a full history of the case should be accepted in which the fever, spleen, and effects of treatment are carefully noted.

I will close by a brief quotation from Laveran's work; he says: "This great frequency of accidents occurring in malaria has been much exaggerated; some observers have come to attribute numberless complications to it, and in the diseases of the warm countries see, so to speak, only various types of malaria. Authors have described an ophthalmia, a urethritis, a rheumatism, all due to malaria. . . . All diseases may be associated with malaria; the condition of anæmia and the feebleness which it rapidly brings about cause of themselves a true predisposition for certain affections like pneumonia and dysentery. . . . The error of those who attribute to malaria all the maladies which may complicate it, or even the greater number of those which have been observed in malarious countries, is certainly not small." This is as true now as when written in 1884, and does not speak well for the profession at large. The mistakes occur in all countries, but it is time their number was growing less rather than more.

ORIGINAL STUDIES IN THE BACTERIOLOGY OF CHRONIC ENDOMETRITIS.

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BEFORE entering upon the study of the bacteriology of the uterine cavity it is important first to consider the bacteria of the vaginal tract. Kaltenbach has claimed that pathogenic micro-organisms are constantly present in the vaginas of pregnant women. Steffeck and Winter found in the vaginal secretions of pregnant women, even when they had not been examined for a long time, numerous varieties of bacteria, among which were pyogenic streptococci, staphylococci, and diplococci.

Ahlfeld claimed that the vagina of every woman contains bacteria which, under favorable circumstances, can be the cause of fever or, indeed, death.

Döderlin differentiated between normal and pathological vaginal secretion. The normal secretion, he claimed, gives a strongly acid reaction; the pathological secretion is feebly acid, neutral, or even alkaline. Bacteriological examination showed in the normal secretion

almost exclusively a single variety of bacillus, which he has designated by the special name of bacillus vaginæ; while in the pathological secretion he found the greatest variety of organisms, including both cocci and bacilli. He found streptococci in 4.9 per cent. of these cases. He introduced into the vagina of a virgin, which normally contained the bacillus vaginæ in pure culture, pure cultures of the staphylococcus aureus. After four days all of the staphylococci had disappeared.

Krönig (*Deutsche med. Wochenschrift*, No. 43, 1894) has found that if nothing is introduced into the normal human vagina for two or three days, it undergoes spontaneous sterilization of all germs except the vaginal bacillus of Döderlin. He introduced pure cultures of the bacillus pyocyaneus into the vagina in twenty cases, and found that they had entirely disappeared in from fourteen to thirty hours.

The experiments of Mengé (*Deutsche med. Wochenschrift*, No. 46, 1894) show the same bactericidal property of vaginal secretion. He found that staphylococci and streptococci were killed in from two and one-half to seventy hours, irrespective of the reaction of the secretion.

Although the results of these experiments are at variance, the observations of Döderlin, Krönig, and Menge have been made with such care and with the advantage of the more recent methods of research, and involve such a large number of cases, that we may assume that they demonstrate the real condition of things. We may assume that the healthy vagina has the power of destroying the ordinary pathogenic bacteria, that when organisms are introduced from without they perish in a few hours or days, and that the only organism capable of withstanding the bactericidal action of the vagina is the benign bacillus vaginæ of Döderlin. As an exception, may be mentioned the gonococcus of Neisser, which is capable of multiplying in the presence of vaginal secretion; and certain other less common organisms which do not enter into the etiology of the ordinary chronic endometritis.

In the uterine canal other conditions are encountered, the chief of which are a difference in the chemical reaction of the secretions and a difference in the anatomical structure of the mucosa. But few reports of studies of the bacteria of the uterine cavity are to be found in literature, and those, unfortunately, show very variable results.

In 1887 and 1888 Laplace (*AMERICAN JOURNAL OF THE MEDICAL SCIENCES*, 1892, vol. civ. p. 438) examined in Koch's laboratory the scrapings from the uteri of six healthy women. These scrapings were obtained by means of the platinum loop. All of the scrapings showed the presence of bacteria, the most common of which were the streptococci of suppuration. There were three varieties that could not be identified. Two of these, when injected into guinea-pigs, caused the death of the animal; the third was a harmless organism.

In cases of endocervicitis he found organisms to be very abundant;

and he identified streptococcus pyogenes, staphylococcus pyogenes aureus, albus, and citreus; a few of the bacillus pyocyaneus, and also many of the three above-mentioned unidentified varieties. He assumed that these organisms are constantly present, but that when the mucous membrane becomes inflamed they exist in much larger numbers. Finally he examined the scrapings from the uteri in six cases of chronic endometritis in the clinic of Prof. Martin, and found in all cases streptococci lodged in the depth of the tissues. He then proceeded to make the following deductions:

1. The normal endometrium of the uterus and cervix is a harbor for vast numbers of micro-organisms, most of which are known to us, but some still unknown yet possessing poisonous qualities for guinea-pigs.

2. The inflamed endometrium contains the same kinds of micro-organisms, but in vaster quantities, the superficial exfoliating cells also containing them.

3. In chronic endometritis the secretions contain about as many infectious organisms, the mucous membrane and fibrous tissue become greatly hypertrophied under the constant development of these organisms, and whether this chronic condition be simple or gonorrhœal, we find the germs both in the epithelial and fibrous tissue.

Contrast this with the more recent experiments of Menge, made in the Gynecological Clinic in Leipsic (*Deutsche med. Wochenschrift*, No. 48, 1894). In the cases of six women he introduced under strict precautions pure cultures of streptococci into the cervical canal. Microscopic examinations showed that the same changes took place as occurred in similar experiments in the vagina, namely, leucocytosis and phagocytosis. In an average of twelve hours all of the staphylococci had been destroyed. He believes that, with the exception of the gonococcus, bacteria cannot vegetate for any considerable length of time in the uterine canal.

To these observations I would add a series of studies which I have made in cases of chronic hypertrophic endometritis occurring in the service of Dr. L. S. Pilcher in the Seney Methodist Hospital in Brooklyn. The technique of my experiments was as follows: The patients were given daily vaginal douches for several days before the operation of curettement. After the patient had been anæsthetized, the vagina was scrubbed out with a gauze sponge smeared with soft-soap, while a constant irrigation of the vagina with boro-salicylic solution was kept up. The patient then being placed in the dorsal position, the vagina was dilated with retractors, the cervix drawn down with the tenaculum, and the external os wiped dry with a bit of sterilized gauze. The uterine canal was then dilated with the instruments of Ellinger and Goodell, and into its cavity was introduced a urethral endoscope of Grünfeldt. This is an instrument composed of a metallic tube fitted with a plunger

which completely occludes its calibre, and which projects slightly beyond the end of the tube, the ends of both being smoothly rounded. This instrument was passed to the fundus of the uterus, and the piston withdrawn. A small, sharp curette was then passed up through the tube to the fundus, and a bit of the mucosa scraped away. This bit of tissue, with some blood and mucus, was introduced into a tube of warm beef-bonillon-gelatin, slightly agitated to distribute the material, and either poured into a Petri dish or made into an Esmarch roll. All of the instruments used in the operation had been sterilized by boiling in soda solution. This procedure was carefully carried out in seventeen cases of chronic hypertrophic endometritis. Twelve of the plates gave no growth. Of the remaining five, one showed pure culture of *staphylococcus pyogenes aureus* in very large numbers; a second showed *staphylococcus pyogenes aureus* and an organism somewhat resembling *proteus vulgaris*; a third showed *bacteria uræ*; a fourth showed pure cultures of *staphylococcus pyogenes albus*, and a fifth showed the same germ as the fourth.

One of the most important facts in all these observations is that in no case was there a growth from the shreds or pieces of mucous membrane which lay embedded in the gelatin. In the cases in which there was a growth of bacterial colonies in the culture medium, the growth never showed any especial relation or connection to the implanted uterine tissue. This is one very strong reason for believing that these organisms do not bear an etiological relation to the chronic endometritis. Their absence in 71 per cent. of the cases is another strong evidence of their innocence. In order to account for their presence we must bear in mind that all of these cases had been subjected to repeated examinations and manipulations before and after admission to the hospital. The passage of the uterine sound might carry into the canal organisms which had been deposited in the mucus at the external os by the examining finger or other instrument. Or, indeed, such germs might have lain enveloped in the mucus at the os externum, protected by the clink in the torn cervix, for in all but one of these cases there was a laceration of the neck of the womb, and, not having been removed by the scrubbing and irrigation, have been carried up by the dilator or endoscope on its introduction. According to the investigations quoted above, the presence of such organisms would give no symptoms, for the reason that they were not only not proliferating, but were in process of extinction. It is a matter of much importance that the cervix and perineum which were repaired in these cases healed primarily, just as in the cases in which the bacterial findings were negative; nor was there any more post-operative rise of temperature.

The results of these observations are at variance with those of Laplace, who found virulent bacteria not only in the chronically inflamed uterus

but in the healthy uterus as well. If my experiments have been defective, the cause of such defect must be sought in the culture media employed. The removal of material for study was much more radical in my cases than in those of Laplace; and if the mucosa was infiltrated with bacteria, as is claimed by him, I certainly implanted them in my culture media. The question of error in the culture media may be eliminated, for the reason that in this same preparation of beef-peptone-bouillon-gelatin I have grown luxuriantly the pyogenic organisms which he claims to have found in the uterine canal.

Another reason arguing for the view that these virulent organisms are not present in chronic endometritis is that I am personally aware of three cases of perforation of the uterus by the sharp curette during the operation of curettage for this condition; and yet in not one of these cases did any sign of peritonitis, fever, or any other untoward symptom develop. In the Leipsic clinic twenty-eight myoma operations have been done by the modified method of Zweifel without any attempt to cleanse the cervical canal, and no bad results have been observed.

On the other hand, my observations are in harmony with those of Krönig and Menge. As a clinical fact, we know that under certain conditions the pyogenic streptococci and staphylococci may give rise to inflammatory processes in the female genital tract, but we know also that these inflammations are always of the acute type, and experimental research has demonstrated that these organisms are not capable of producing a non-febrile, slowly progressing, chronic inflammation. In many cases of chronic endometritis there has never been an acute inflammatory process, but the disease has come on gradually and insidiously. Although we have been able to find no micro-organism in the fully developed stage of the disease, yet we are in no position to declare that bacteria play no etiological rôle. We do know that after acute inflammations of the uterus and adnexa due to the gonococcus of Neisser, or to the organisms which produce the fever of the puerperal state, chronic inflammatory changes supervene; but whether some form of bacterial infection is necessary for the production of these changes is questionable, and, indeed, improbable.

From conclusions based upon the study of a large number of sections of uteri the seat of chronic endometritis, I am convinced that it is no more necessary to seek for a microbic origin in chronic endometritis than in chronic degeneration of any of the other glandular organs. The glandular portion of the uterus is made up of secreting epithelial cells resting upon a connective-tissue stroma, just as in the kidney, liver, or breast. Either one of these elements may become changed or increased through irritative or trophic disturbances without the presence of bacteria.

THE NECESSITY FOR PROMPT SURGICAL INTERFERENCE IN
TYPHOID PERFORATION; ALSO IN TYPHOID FEVER
COMPLICATED BY APPENDICITIS.¹

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THE hope of eliciting a discussion advantageous to both the surgeon and physician is my reason for presenting a short paper upon the important points in the diagnosis and treatment of typhoid perforation, and of appendicitis complicating typhoid fever, affections in which the necessity for prompt interference cannot be denied.

Perforation plays an important rôle in the mortality of typhoid fever; in eighty autopsies Osler found twenty cases of perforation. This condition may sometimes be overlooked, and a few cases undoubtedly recover without operation; but experience has shown that by early recognition of perforation and by prompt surgical interference the mortality of typhoid fever may be to a considerable degree lessened. Appendicitis sometimes occurs as a complication of typhoid fever, and is probably due to an extension of the inflammation from the ileum, attacking the solitary glands of the appendix; the structure, calibre, and lower vitality of the appendix render it much more vulnerable than the ileum to perforative ulceration. Appendicitis arising in connection with typhoid fever may jeopardize the life of the patient, if the appendix is not promptly removed. The presence of typhoid fever does not, in all instances, forbid operation for the removal of the appendix. To differentiate between perforative appendicitis and perforated typhoid ulcer is usually difficult, and at times even impossible.

The most important point in the diagnosis of typhoid perforation is the history. In the majority of cases the diagnosis of typhoid fever has previously been made, the exceptions being those cases of the walking variety, where the patient has not been under observation at all, or has been seen by the family physician only once or twice as an office patient. Under these circumstances, when the physician has not had the opportunity of studying the case sufficiently to enable him to make a diagnosis, and the patient becomes the subject of perforation, we can plainly see how difficult it would be to determine definitely the nature of the abdominal lesion. The case I report will illustrate this.

Perforation is most common at the end of the second or during the third week. In one of Osler's cases it occurred as early as the eighth day, and in another during the sixth week, two weeks after the evening temperature had become normal (Osler). Perforation may be associated with hemorrhage; but this is not the rule. The exciting

¹ Read before the College of Physicians, January 3, 1896.

cause of the perforation may be indiscretion in diet, vomiting, excessive tympany, and physical exertion. The location of the perforation is usually in the terminal twelve inches of the ileum. It may occur, however, in the colon. The onset of perforative symptoms is sudden; there are vomiting and severe abdominal pain, immediately followed by pronounced general rigidity of the belly-walls and general abdominal tenderness, followed by abdominal distention. Rigidity of the abdominal walls is, in my judgment, a most important and significant sign. In addition to these local signs there may be collapse, as evidenced by a sudden fall in the temperature even to the subnormal, rapid and small pulse, and pinched countenance. If there be general abdominal tenderness and tympanites before perforation occurs, the diagnosis is obscured.

The occurrence of sudden acute abdominal pain, with very decided general abdominal rigidity and tenderness, with or without collapse, is in a typhoid fever patient the strongest possible indication for immediate abdominal section. To wait after the advent of these symptoms for further corroborative evidence of perforation is fatal, for septic peritonitis, with a belly full of pus, will surely follow, thus not only adding to the difficulty of operation, but taking away from the patient the only chance for saving life. Why delay should be countenanced, in the light of the strong evidences of the approaching enemy, I cannot understand. It cannot be on the sole ground of objection to opening the belly of a typhoid fever patient. Even in the absence of a perforation an abdominal section could add but little additional danger. This is proven by the case of removal of the appendix in appendicitis complicating typhoid fever which I report, and which ran a typical course after the operation, the patient being bathed as usual, under the direction of my colleague, Dr. J. C. Wilson.

In the presence of symptoms of perforation it is not always conservative to defer opening the belly. Again, this naturally is not a question for the medical man alone to determine, but one in which the surgeon should be called in counsel. Aseptic surgery has enabled the surgeon to meet successfully many conditions heretofore regarded insurmountable, and I therefore urge my medical friends to divide with the surgeon the responsibility of these cases. I am sure that in this way the opportunity for doing good will be greatly increased. A sufficient number of cases of recovery following operation for perforated typhoid ulcer are now on record to lead to the rational conclusion that the patient subject to this most unfortunate condition had previously not been justly treated. Too often the cry is that the condition of the patient is not good enough for operation. Suppose the surgeon were content to allow this to influence him in the case of internal hemorrhage from other causes, how many lives would be daily sacrificed?

Fortunately, appendicitis occurring as a complication of typhoid

fever is not common. Appendicitis occurring in the presence of typhoid fever does not produce symptoms unlike those seen in the disease when it is present as an independent affection. As is usual, a history of a previous attack or attacks can be elicited. The sudden onset of pain referred to the epigastrium or umbilical region, nausea followed by vomiting, which ceases, as a rule, when the pain becomes localized in the right iliac fossa, the circumscribed tenderness which corresponds to the site of the appendix, and the circumscribed rigidity of the immediately overlying belly-walls will in the greater number of cases suffice to warrant the diagnosis of appendicitis. When appendicitis occurs in connection with typhoid fever the diagnosis cannot always be clear, because of the likelihood of perforation in the latter affection. Experience also teaches that typhoid fever is the cause of chronic appendicitis in a small percentage of cases. The following cases illustrate the statements advanced in the paper:

Appendicitis Complicating Typhoid Fever.—N. W., domestic, aged sixteen years, was admitted to the German Hospital May 3, 1897. A history of numerous attacks of colic during past years, often quite severe, was elicited. The patient had been engaged at her usual occupation up to within five days of her admission, when she was compelled to give up on account of indisposition. On the evening previous to her entrance into the hospital she was attacked by severe pain in the epigastric region, associated with vomiting. The pain soon became localized in the right iliac fossa, and was accompanied by circumscribed tenderness and rigidity, corresponding to the usual location of the appendix. Constipation was present. Pulse 100 and temperature 103° F. on the evening of the day of admission. A careful examination of the abdomen showed, in addition to the above-mentioned signs, slight tympany, decided enlargement of the spleen, and the presence of a few rose-colored spots. We were unable to elicit a history of the prodromal symptoms of typhoid fever, and therefore concluded, from the indisposition of the patient for five days before admission, the presence of the enlarged spleen, which was not tender to pressure, and the rose-colored spots, that the case was one of typhoid fever complicated by acute appendicitis. Unfortunately, the time was too limited to learn the results of the Widal test.

Operation for the removal of the appendix was advised. This was done on the evening of the day of admission. The usual incision was made. The intestines were distended; the ileum much congested; the appendix was found behind the cæcum, acutely inflamed in the terminal half, and contained pus where it was indurated. Appendix removed; wound closed. Light dressing applied and held in position by strips of adhesive plaster. The acute pain subsided directly after operation. Patient transferred to the medical wards under the care of Dr. J. C. Wilson, my colleague, where she received the bath-treatment. Recovery uneventful.

Typhoid Perforation.—D. F., aged twenty-seven years, admitted to the German Hospital November 7, 1897. Typhoid fever; perforative ulcer; free pus in abdomen.

Previous history: He had typhoid fever ten years ago, and so belongs to that rather rare class in which a second attack of typhoid occurs.

Present history: Ten days before patient was brought to hospital he complained of malaise. Had headache one week previous to admission. Bowels were rather constipated. Two nights previous to admission his temperature was 102° F. (only time that temperature was taken by him). On Saturday night (the night previous to admission to hospital) patient partook of a heavy meal. After eating dinner he attempted to see some patients, when he was suddenly taken with severe abdominal pain, necessitating his going to bed. For this pain he took sulphate of magnesia, applied hot-water bottles to the abdomen, and drank freely of warm drinks. Pain in abdomen was severe, requiring morphia. Sunday morning the entire abdomen was distended, very rigid, and exquisitely tender, especially over lower right quadrant. I was called in consultation by his attending physician, Dr. Eckman. After the examination we were convinced that there was a serious intra-abdominal lesion, probably slow leakage from a perforated typhoid ulcer, as indicated by the history and the condition. We were, however, by no means certain that it was not a perforated appendix. I advised operation, emphasizing the fact that delay would be dangerous. Operation revealed a belly full of pus, with free gas in the abdomen. The appendix was intensely congested, and was removed. No attempt was made to locate the perforation, on account of the difficulty experienced in dealing with the intestines, which were greatly distended, so that, notwithstanding the small incision and the use of gauze packing, etc., it was almost impossible to keep them in the belly-cavity. I therefore contented myself with thorough irrigation and drainage. The patient ran a typical course of typhoid of most severe type, complicated by several hemorrhages from bowel. He was transferred to my medical colleague, Dr. J. C. Wilson, and it gives me pleasure to report the patient's recovery. This case responded to the Widal test.

The pathological examination showed ulceration of the mucous membrane, submucous and muscular coats of the appendix.

The following occurred in the practice of Dr. H. C. Deaver:

Male, aged thirty-five years. Had run a typical course of typhoid fever. At the beginning of the third week he had a sudden sharp pain accompanied by rigidity of the abdominal muscles and followed in a short time by marked evidences of peritonitis. The inflammation of the peritoneum localized itself, and the patient slowly improved. Perforation had been diagnosed, and operation advised and refused. At the end of ten days following the perforation the peritonitis again lit up and became general, the patient promptly dying.

Autopsy showed that there had been a localized peritonitis, with perforation and extravasation of feces at the site of one of Peyer's patches.

Male, aged thirty-six years. Had sudden onset of abdominal pain, accompanied by severe shock and marked rigidity of the abdominal walls, occurring in the third week of the disease. Diagnosis, perforation. Thirty-six hours later the patient was operated upon. The peritoneal cavity contained pus, and a pin-hole perforation was found in the ileum. Death. No autopsy.

Boy, aged nineteen years. Had perforation with typical symptoms occurring in fifth week of the disease. Refused operation. Patient died on the third day following the diagnosis of perforation. No autopsy.

REVIEWS.

PRACTICAL DIAGNOSIS: THE USE OF SYMPTOMS IN THE DIAGNOSIS OF DISEASE. Second edition. Revised and enlarged. By HOBART AMORY HARE, M.D., B.Sc. Illustrated with 201 engravings and 13 colored plates. Philadelphia and New York: Lea Brothers & Co., 1897.

NOT so very long ago a physician friend asked what was the best book on practical therapeutics. "I want a book," he said, "that is practical. When I have a case of colic to treat I want to turn in the index to 'colic' and find what to do for the case, without stopping to figure out the exact cause of the colic and without wading through a mass of physiological actions of drugs to see which one will suit the case." While cautioning him against indiscriminate prescribing after this machine fashion, we told him Hare's *Practical Therapeutics* would come as near to filling his need as any book with which we were acquainted. If any one in a similar frame of mind should inquire what book we could name that would help him to find quickly and with little effort what was the disease indicated by a particular symptom—*e. g.*, vomiting, colic, strabismus—we might reply, "Consult the copious index to Hare's *Practical Diagnosis*, and you will be referred to the page where light will be shed on the vexed question of the meaning of the symptom."

This work, rightly used, can be of great help; but it is rather to refresh one's memory, or to present known facts in a new light, than to furnish knowledge for the first time, that it is valuable. For instance, it has much that is of importance on the physical exploration of the chest; but it is not the book to place in the student's hands as a textbook on the physical diagnosis of diseases of the heart or lungs. And we do not believe the author ever intended it to be such.

The service done by this work is to call back some physicians, who are striving to make a diagnosis, from too close a consideration of the test-tube, the microscope, and the inoculated animal, to the pulse, the tongue, the fever, the mental state, the sounds of the heart, the color of the stools, the complaint of dizziness, the cough, etc. It aims to retain many of the heritages of our forefathers. The erudite touch that could detect the rise of temperature from the feel of the skin or the character of the pulse, and that located the abscess by the fine sense of fluctuation, or the change of contour, or the feeling of resistance, ought not to belong to a lost art. The thermometer, the microscope, the test-tube have made mere machines of too many already. And the Röntgen ray will have a tendency in the same direction. It is against this purely mechanical method of diagnosis by the aid of instruments and technique of precision that Hare has written. Not that he underestimates, in the least, the value of the exact instrumental methods. Far from it. But

he contends for the cultivation and employment of these older and natural methods, believing that even before the detection of tubercle bacilli in the sputum many cases of pulmonary tuberculosis were accurately diagnosticated, and that even before the day of Laveran and of Widal clear clinical distinctions were possible, in the majority of instances, between typhoid and malaria.

That Hare has touched a popular chord is shown by the early exhaustion of the first edition. Less than a year ago it was our pleasure to review the first edition in the pages of this JOURNAL.

The second edition has been enlarged by a few pages, and some ten new figures have been added. There has been shown a nice discrimination in the selection of figures and diagrams, of which there are two hundred. Each one is truly a help in diagnosis, teaching a lesson, oftentimes, as clearly as can be done in printed text.

This text, by the way, is generally clear and concise. At times it has seemed to us as though a careful revision, with more careful attempt at a systematic presentation of topics, would enhance the value of the book. We do not mean that the book is hastily written; but there is not that painstaking study of every paragraph and sentence that we see in some works, where one topic succeeds another in such natural, orderly sequence that we are amazed at the ease with which we read and understand, and only find the explanation when we come to analyze critically the make-up of the article, and find that the author has thoughtfully and studiously wrought out this order from a preceding chaos, that the strength and charm are the result of careful and arduous labor.

We are pleased to notice the popularity of Hare's work, and feel that it is destined to go through many subsequent editions, for it meets a popular demand and is a book that can be warmly recommended alike to student or practitioner.

J. B. H.

DIE MIKROSKOPISCHE DIAGNOSTIK DER BÖSARTIGEN GESCHWÜLSTE. VON DR. DAVID HANSEMANN, Privatdocent an der Universität Berlin, und Prosector am Krankenhaus im Friedrichshain. Mit 83 Figuren im Text. Berlin: Verlag von August Hirschwald, 1897.

THE MICROSCOPICAL DIAGNOSIS OF MALIGNANT GROWTHS.

In an introductory and eleven special chapters, Hansemann presents to the reader all that is worthy of note in connection with the important subject of the microscopical diagnosis of malignant growths. The author's style is most attractive and the subject-matter set forth in so fascinating a manner that the interest in the work never flags. Like Bunge's famous work on *Physiological Chemistry*, so might Hansemann's book be termed a scientific novel. The reasoning everywhere appears so strictly logical that the reader at first is inclined to agree to conclusions which, upon more careful consideration, he would, perhaps, not always indorse. In places the polemical spirit of the German becomes manifest, and the writer is perhaps more aggressive toward individuals than would be expected in a work of this character. These, however, are minor points, and, taken as a whole, Hansemann's exposition of the subject must certainly be regarded as truly classical.

In the first chapter the various attempts at a satisfactory classification of tumors in general are considered, and the principal difficulties in the way of such classification set forth, not the least being owing to our inability to find an appropriate definition for the term "tumor." The old saying of Virchow, that there is not a living being who could state, even under torture, just what a tumor is, still holds good at the present day. Regarded from a practical stand-point, a classification of tumors is only possible upon a morphological basis. According to Hanseemann, a carcinoma is a tumor in which stroma and parenchyma can be distinctly separated the one from the other, while such a differentiation is less pronounced in the sarcomata, where the individual parenchymatous cells enter into an intimate connection with each other and the stroma, and at the same time form an intercellular substance. In both cases an extension of the growth beyond the normal boundaries of the invaded tissue occurs. In carcinoma and sarcoma, then, we can distinguish between parenchyma and stroma; but while in carcinoma this is usually possible at once, such a differentiation in the case of the sarcomata is rather more conceded on theoretical than on practical grounds. At the same time, however, it must be admitted that carcinomata occur in which the stroma is most imperfectly developed, while certain sarcomata, on the other hand, exhibit a most abundant growth in this respect. A sharp line of demarcation between the two kinds of tumors, hence, does not exist, and Hanseemann, perhaps justly, suggests that it were better to do away with the terms carcinoma and sarcoma altogether. Unfortunately, however, other and more suitable terms cannot be substituted at the present time.

In the second chapter the morphology of malignant growths in relation to the mother-tissue is considered, and the nomenclature of the various forms of carcinoma and sarcoma presented in a most comprehensive manner. Very important is the dictum: "The parenchyma of a primary growth results from the parenchyma, the stroma from the stroma of the organ in which the tumor originates." The parenchymatous cells result from the mother-cells by a process of direct genesis or as a result of a metaplasia. The subject of metaplasia is then discussed in great detail. The writer recognizes the existence of two forms—viz., metaplasia proper, in the sense of simple variation, and anaplasia, where the character of the cells has undergone a complete change both morphologically and physiologically, so that entirely new species result. The subject of anaplasia plays a most important rôle in Hanseemann's oncology, and is in reality its basis. The degree of anaplasia is measured by the extent to which the individual cells have deviated from the mother-cells; its highest grade is thus met with in the medullary carcinoma. Practically important is the observation that a carcinoma of slight anaplasia may, in the course of time, become highly anaplastic.

The third chapter is devoted to the karyokinetic changes occurring in malignant growths, and is without doubt one of the most interesting in the entire work. Asymmetric mitoses, although occurring quite constantly in carcinoma, cannot be considered as absolutely characteristic, as they are occasionally also observed in sarcomatous growths. It is important, however, to note that according to Hanseemann they are never found under other conditions. He thus differs from Ströbe. As migratory degenerative chromosomes likewise only occur in carcinoma and sarcoma, it follows that hypochromatic cells are only encoun-

tered under these two conditions. Very important, furthermore, is Hanseemann's observation that, while normally, as well as under other pathologic conditions, the character of the normal mitoses is constant for every particular cell-species, deviations occur in malignant growths. The degree of the deviation is directly proportionate to the degree of deviation of the tumor as a whole from the mother-tissue, the greatest variation being accordingly met with in medullary carcinoma, where at the same time a uniform character in the mitoses of the growth itself can no longer be recognized. But this in turn is really characteristic in itself. Only a positive result, however, is of value. From the fact that we do not observe a marked deviation, we are not entitled to the diagnosis "benign" growth, as the deviation may be so slight as not to be recognizable.

In the next chapter the degenerative processes which may occur in the parenchyma of malignant growths are carefully considered. Then follows a most excellent discussion of the relation existing between primary growths, metastases, and recurrences. The transplantation theory is regarded as an established fact. The metastases either show the same structure as the primary growth, or they exhibit a deviation of an anaplastic character. The same holds good for the recurrences.

The sixth chapter deals with the stroma of malignant growths, its origin, development, retrogressive metamorphoses, etc.

The important question, how to differentiate between metastases and primary growths, is admirably discussed in the seventh chapter. The function of tumor-cells is then considered, but, although the chapter is interesting in itself, it appears to be written rather more from the standpoint of the pathological anatomist than from that of the pathological physiologist. It is, perhaps, the least attractive section of the book. Hanseemann denies that a malignant growth can result if a proliferating stimulus falls upon a normal cell. A hyperplasia, only, can occur under such conditions. A malignant growth will be the outcome if such a stimulus attacks an anaplastic cell. In this respect Hanseemann materially differs from Ribbert, and becomes rather aggressive in the defence of his personal views.

Chapters nine, ten, and eleven, finally, which are devoted to the histogenesis of malignant growths, their etiology, and the significance of the microscopical examination as to diagnosis, respectively, are again excellent. The objections to Cohnheim's embryonic theory are ably discussed and maintained. Of the parasitic origin of the malignant growths he says the following: "At this place we neither wish to criticise nor describe things which, as we hope, already belong to history, and we merely wish to point out that degenerated cells, karyokinetic figures, secretion-products of the cells, white and red blood-corpuscles, their products of degeneration, and, finally, normal carcinomatous cells have been described as parasites," etc.

As we have already said, Hanseemann's book is truly excellent, and certainly merits a translation into other languages. To the modern pathologist it is indispensable.

The illustrations are fairly good, and the typography of the work in conformity with the excellence maintained by its well-known publisher, August Hirschwald, of Berlin.

C. E. S.

RINGWORM AND ALOPECIA AREATA: THEIR PATHOLOGY, DIAGNOSIS, AND TREATMENT. By H. ALDERSMITH, M.B. Lond., F.R.C.S. Fourth edition, enlarged and rewritten, with new illustrations. London: H. K. Lewis, 1897.

THIS is essentially a new book, and represents in clear, terse language our present knowledge of the cause, symptoms, and treatment of ringworm. The author adds the weight of his authority to the correctness, in the main, of the discoveries made by Sabouraud as to the plurality of the fungi causing this disease. It is now recognized that there are several fungi instead of one, as formerly believed, which are distinct botanically, morphologically, culturally, and clinically. These fungi—the author following Sabouraud—are divided into two classes—the small and the large spore-fungi; of the latter there are several varieties. The most common form of ringworm of the scalp is that due to the small spore-fungus—*microsporon audouini*. This does not produce ringworm of the bearded region or of the nails, but small furfuraceous lesions are sometimes seen on the non-hairy parts. It is the most contagious type and, as a rule, the most rebellious to treatment. One variety of the large spore-fungus—the *trichophyton megalosporon endothrix*—is also met with on the scalp of children, and as a rare exception on the scalp of the adult; it does not invade the bearded parts or the nails, but sometimes produces transitory forms of body-ringworm, especially on the face and neck. The author cannot entirely agree with the general statement made by Sabouraud, that this type is not so rebellious. The other variety of the large spore-fungus—the *trichophyton megalosporon ectothrix*—is infrequent upon the scalp, but it is the fungus to which the common patches of body-ringworm, ringworm of the bearded region and of the nails are due. Sabouraud's statement is quoted that this variety is essentially an animal fungus, and is communicated to man from this source. It is the fungus usually found in pustular ringworm and in kerion.

Coming to the subject of treatment, it is learned that comparatively little progress has been made. The author's large field of observation in these cases has given full opportunity for the trial of the various vaunted new remedies, of which advantage has been taken; but the regret is expressed that the chronic types of the disease remain about as rebellious as formerly. It is remarked, as those of wide experience know, that there are cases, especially those of limited area and of short duration, which will respond to prompt and active application of various remedies. There remain, however, many cases which prove obstinate and rebellious to almost all methods. The writer believes the best general plan in these obstinate cases is to treat the disease with the remedial applications commonly employed, which will usually prevent its spread, and which will also usually bring the area of disease down to one or to a few well-defined patches; this being reached, he has recourse to treatment with croton oil. The author has also used the croton-oil method in single beginning areas, especially when for the educational interests of the child a rapid result was necessary. Particular directions are given as to the manner of its application, as it is a remedy which requires care and skill to bring about the favorable result without permanent damage to the skin. Formalin—a 40 per cent. solution of formaldehyde—the writer has also tried, and found it useful in some cases, but it is painful, and in his hands less certain and less successful than the croton-oil

method; it is, however, a safer remedy in the hands of the inexperienced.

Alopecia areata is discussed at less length than ringworm, and very properly so. Aldersmith is not a believer in its contagiousness, nor does he see any reason for considering it a parasitic disease. In the treatment, stimulation of the part is advised, with such remedies as iodine, cantharides, and the like, together with tonics, if necessary. The local treatment is considered the more important, and general treatment alone useless.

In conclusion, the reviewer takes pleasure in recommending this most excellent and comprehensive book, especially to those whose misfortune it is to have much to do with ringworm cases.

H. W. S.

A TEXT-BOOK OF SPECIAL PATHOLOGICAL ANATOMY. By ERNST ZIEGLER, Professor of Pathology in the University of Freiburg. Translated and edited from the eighth German edition by DONALD MACALISTER, M.A., M.D., Linacre Lecturer of Physic and Tutor of St. John's College, Cambridge, and HENRY W. CATTELL, M.A., M.D., Demonstrator of Morbid Anatomy in the University of Pennsylvania. Sections I.-VIII. New York: The MacMillan Company, 1896.

SINCE the publication, in 1884, of the first English edition of Ziegler's *Special Pathological Anatomy*, five German editions have appeared in rapid succession. The present is the third English edition of this popular text-book. The text has been entirely retranslated and the bibliography and other supplementary portions have been recast, references to only the more recent and important papers and monographs having been included. By omitting the references to the earlier literature, which are to be found in the previous English editions, much "valuable space has been gained." Presumably the editorial work of the translators referred to on the title-page has consisted in this recasting of the bibliography, which, it must be acknowledged, has been done carefully and judiciously, although one of the most valuable features of Ziegler's text-books of *General and Special Pathological Anatomy* have been their conveniently arranged lists of bibliography. It was, therefore, a matter of disappointment to many American teachers of pathology that the recent translation of the last German edition of Ziegler's *General Pathology*, issued by another firm, omitted entirely all references to the literature. The second part of the *Special Pathological Anatomy* (Sections IX. to XV.) is already in press, and this is to be followed by a new version of the part on *General Pathological Anatomy*, prepared from the latest German edition, so that soon all the systematic works by Ziegler will be accessible to the English reader in uniform style.

The volume at present under consideration contains, as already indicated, the first eight sections of the eighth German edition of the *Special Pathological Anatomy*, namely, those dealing with the morbid anatomy of the Blood and Lymph, the Vascular Mechanism, the Spleen and the Lymph-glands, the Osseous System, the Muscles and Tendons, the Central Nervous System, the Peripheral Nervous System, and the Skin. At the end of the volume is a full index. The constantly

increasing size of the original German editions of the work makes this division of the English translation into two volumes necessary, in order to secure good typography and convenient bulk, although the practical serviceability of the translation naturally suffers some on this account, because it is not indicated on the back of the present volume what parts of pathological anatomy are here dealt with.

The translation has been carefully made, and there seems to be no occasion for any criticism. The more important designations of different morbid processes are, as in the original, printed in heavy-faced type. The reproduction of the illustrations is as successful as in the original. The good quality of the paper of the English version brings out the black and white figures with satisfactory clearness. The titles of the references have been translated into English in the case of the journal articles, while the titles of monographs and independent publications are printed in the original language. Some of the abbreviations of the names of the serial publications are, perhaps, a little anomalous, as, for instance, *V. A.* for *Virchow's Archiv*. The references have been found to be correct as far as the reviewer has had occasion to subject them to control.

Any extended review or criticism of the subject-matter proper is hardly in place at this time. The number of the German editions of the original attests to the general serviceability of the work, both as a text-book for students and as a work of reference for more independent workers. The paucity of sufficiently elaborate works on special pathological anatomy in the English language renders this translation a doubly valuable addition to our literature. It is well to bear in mind, however, that the book does not give a satisfactory summary of the contributions of American or English investigators to the subject with which it deals. Important American and English researches are not referred to as frequently as they merit. Naturally the literatures laid under contribution are the German, first and foremost, and then the French and Italian. Full justice in this respect will probably not be done the literature of "Greater Britain" until some American or English pathologist essays to summarize our knowledge of pathological anatomy in our own language in a sufficiently comprehensive manner. L. H.

THE MENOPAUSE: A CONSIDERATION OF THE PHENOMENA WHICH OCCUR TO WOMEN AT THE CLOSE OF THE CHILD-BEARING PERIOD, WITH INCIDENTAL ALLUSIONS TO THEIR RELATIONSHIP TO MENSTRUATION. ALSO A PARTICULAR CONSIDERATION OF THE PREMATURE (ESPECIALLY THE ARTIFICIAL) MENOPAUSE. By ANDREW F. CURRIER, A.B., M.D., New York City. New York: D. Appleton & Co., 1897.

THIS is a small octavo volume of two hundred and eighty-two pages, containing a complete bibliography and index. The author's extensive experience has enabled him to handle the subject in a masterful manner. He lays particular stress upon the fact that the menopause is a physiological process, and is not fraught with necessary dangers. The majority of women, despite the traditional teachings of the past, pass through it with but little disturbance. When symptoms of ill health, nervous

disorders, hemorrhage, and pain accompany the menopause, some local or general cause must be looked for. The author also combats the theory that there exists an intimate relationship between cancer of the womb and the breast and the menopause, and he makes a strong plea for early resort to surgical measures when indicated.

The book is divided into seven chapters. Chapter I. deals with historical and other preliminary considerations, and gives an interesting review of the literature of the subject and the superstitions of ancient writers in regard to it.

Chapter II. is devoted to a study of the anatomical changes in the reproductive organs as a result of the menopause.

Chapter III., which is perhaps the most valuable part of this work, is a consideration of some of the factors which influence the advent and progress of the menopause, such as age, disease and traumatism, climate, heredity, temperament, and accidental influences.

Chapter IV. is devoted to the phenomena of the menopause, normal and morbid, and their duration. It is claimed that the type of experience during the menopause should be a condition of health; it is not critical in the sense that it is dangerous to either life or health.

Chapter V. is an interesting study of the causes and symptoms of premature menopause, and Chapter VI. deals with the retarded menopause.

The last chapter is devoted to the treatment of the various local and general symptoms. The book is a valuable contribution to medical literature. The style is clear and convincing. J. B. S.

ENGLISH SANITARY INSTITUTIONS. By SIR JOHN SIMON, K.C.B., etc.
Second edition. London: Smith, Elder & Co., 1897.

THE first edition of this work appeared in 1890, and the second, except for the addition of two appendices, is virtually a reprint of the original book. Although addressed to the layman, as well as the physician, and therefore not strictly a scientific work, it is the most important one in the historical development of sanitation which has yet appeared, and therefore most valuable for all members of the medical profession. The word "sanitation" is here used in its broadest sense, and not merely limited to drainage of houses and towns, but covers all those trades and occupations which directly influence the welfare of mankind. And no member of the medical profession can be considered worthy of his caste unless he takes an active interest, in so far as it is possible, both practically and theoretically in such sanitary institutions. The author of this work was for thirty years medical officer of Her Majesty's (Queen Victoria's) privy council, and may be considered as the founder of modern sanitary science. As the product of a profound scholar and able writer, and with the authority of years devoted to improving the conditions of life of all classes in the British Empire, the work is of the utmost import. Although the second half of the book is devoted almost entirely to a consideration of the legislation enacted during Queen Victoria's reign, in sanitary matters, which apply strictly to England, yet a careful study of these will be of aid to any

physician who may be attempting to form and carry through sanitary measures. In this country such matters are left so much to the individual States, cities, towns, and villages that a strict comparison between the state of affairs in England and in this country cannot be made; but, nevertheless, much help can be had from studying how to avoid making such mistakes as occurred in England and retarded the growth of sanitary improvements during the past twenty years, after the retirement of Sir John Simon from office. Had he remained in office, and had the reforms been enacted which he had so earnestly worked for during his administration, it is more than probable that England would have been spared the terrible epidemics of typhoid fever which have lately been raging in some of her towns. The last two chapters of this volume deal in a broad manner with poverty, and the best means to elevate the lower classes; although but brief, the sketch is full of wise judgment, and might well be used as a basis of study by all who wish to pursue the subject further.

The first half of the book is divided, strictly speaking, into three parts: first, sanitary institutions in pre-historic and post-mediæval times; second, from post-mediæval times through the reign of the Tudors and Stuarts in England; and, third, from that time to the reign of Queen Victoria. This part of the work will be found especially attractive by the layman, for as a chapter in history and welfare of mankind he will be able to see how happiness and progress in civilization are in a very great measure directly dependent on the health of the people at any given time. In connection with the chapter on Roman institutions, those interested will find much fresh information in Lanciani's "The Ruins and Excavations of Ancient Rome," 1897. With a population of over a million of inhabitants, Rome had a far better water-supply than any city of to-day, and for the poorer classes this is one of the most important factors in aiding them to be clean both in body and mind. Their tenement-houses were no better than ours—badly built and overcrowded, with rents very high, so that the poor probably suffered as much then as they do now from those evil effects which follow overcrowding.

Coming down to the middle and dark ages, Sir John Simon has traced in a most clear and instructive chapter the influence exerted by the various orders of monks on the outside world; that they did greatly alleviate suffering and increase happiness is not to be questioned for a moment, but as the orders sank lower and lower in repute, much distress and misery followed, although the seeds they had laid for the improvement of the poorer classes did last and produce much that was to be of permanent benefit.

But it was in the eighteenth century that modern preventive medicine may be said to have had its birth, and the chapter in which the author pays his tribute of devotion to, and traces the work of, such men as Mead, Pringle, Lind, Baker, Blane, Jenner, and others, is one of the most absorbing. Few know, except in the case of Jenner, how much thankfulness is due these men, who, by their work, ameliorated to an immense extent the sufferings of mankind, especially in the English army and navy. These men all belonged to the medical profession; but to such men as Howard, Wilberforce, and Granville Sharpe equal honor is due for the work they did in other departments of sanitary science. The wrong done the East Indians and the trial of Warren

Hastings developed new sympathies and produced changes of administration over conquered nations the effects of which will be permanent while civilization lasts.

It is impossible to do justice to this book in a short review; we wish only to bring out its more salient features, and trust that its inherent interest will be recognized from our short abstract. R. N.

SINESORGANE. Erste Abteilung HAUT (Integumentum Commune). Von PROF. DR. A. V. BRUNN. Handbuch der Anatomie des Menschen, herausgegeben von PROF. DR. KARL VON BARDELEBEN. Fuenfter Band, erste Abteilung. Jena, 1897.

ORGANS OF SENSE: THE SKIN.

THIS is part of an elaborate and valuable work on human anatomy, to be completed in eight volumes. It discusses the normal anatomy of the skin in a comprehensive and masterly manner, embracing most of the fine work that has been done during the past decade. It contains no less than 117 wood-cut illustrations, many of them original, comprised in eighty-six large octavo pages. We commend the volume with unqualified praise. L. A. D.

ATLAS DER SYPHILIS UND SYPHILISAENLICHEN HAUTKRANKHEITEN FUER STUDIRENDE UND AERZTE. Von DR. MED. MARTIN CHOTZEN. Heft. 1 und 2. Hamburg und Leipzig (Leopold Voss), 1897.

ATLAS OF CUTANEOUS SYPHILIS.

THIS *Atlas of Syphilis and Diseases of the Skin Resembling Syphilis*, designed for students and practitioners, is likely, when completed, to be of much value, not only to the reader having a knowledge of the German language, but to others as well. The plates are small, chromolithographic, and, upon the whole, well drawn and colored. The text consists solely of brief notes of the cases depicted. Part I. contains fourteen plates, Part II. six plates. The subjects treated of in these two parts are the various forms of initial lesion in the male and female; a few of the early cutaneous eruptions; urticaria, erythema multiforme, pityriasis versicolor, maculae following scabies, and maculae following the macular syphiloderm of the leg.

It is stated that the work will appear in twelve parts, one each month, and will contain 109 pictures, on 72 plates (77 pictures representing syphilis, 32 non-syphilitic diseases). The price of each part will be three marks. The pictures will all be original. L. A. D.

PROGRESS OF MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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Phesin and Cosaprin.—DRS. ZOLTÁU V. VÁMOSSY and BÉLA FENYVESKY state that the first of these is a sulpho-derivative of phenacetin and the second of acetanilid. Phesin is a reddish-brown, light, amorphous powder, without odor, of a slightly caustic and salty taste. It is readily soluble in water, coloring it Bismarck brown, and the reaction is slightly acid. Cosaprin is a grayish-white, light, amorphous powder, without odor, of a mild salty taste. It is readily soluble in water; the solution is colorless, or, if concentrated, a pale yellow; its reaction is slightly acid. The advantages claimed for these substances are as follows: 1. Their solubility is greater, and this permits of their hypodermatic use. 2. Their rapid action. 3. In comparison with their basic substances (phenacetin or acetanilid), they are harmless. The short duration of the effects of their administration is a disadvantage, but this is remedied by the successive exhibition of smaller doses. The dose should be one and one-half to one and three-quarters times that of the basic substance.—*Therapeutische Monatshefte*, 1897, Heft 8, S. 428.

Health Resorts and Water for the Anæmic.—DR. HERMANN WEBER sums up an interesting paper as follows: 1. The majority of cases can be treated without either spas or special climates, although the latter can be rendered useful in most instances. 2. Anæmic patients are often in so great a state of weakness that no journey, either to spas or climatic resorts, ought to be attempted, but a preparatory treatment ought to precede the change. 3. In many cases the attention to climate is more important than to mineral waters, because the medical agents contained in the latter can be supplied pharmaceutically. In all cases in the selection of spas special attention should be paid to the question of climate. 4. Many anæmic patients do equally well at the seaside and on mountains; but, as a rule, more torpid cases are better influenced by the seaside; more excitable, better by sheltered moun-

tain resorts, in medium, not in the highest elevations. Cases with considerable dilatation of the heart ought not to be sent either to level seashores or to highly elevated places, but to mountain resorts below three thousand feet above sea-level. 5. The influence of change is so great that anæmics residing or having fallen ill at the seaside ought to be removed to the mountains, and *vice versa*. 6. In the selection of mineral water the causes of the anæmia and the complications must always be carefully considered. Chalybeate springs are certainly not always the proper means of treatment. 7. Proper arrangement of diet and exact rules as to exercise are of the greatest importance, as well in the climatic as in the spa treatment of the anæmic. 8. The mental condition requires the most careful attention. A moderate degree of agreeable occupation and of enjoyment is usually essential; hence it is necessary to consider not merely the questions of good accommodation and food, but also the society likely to be met at the place selected, the beauty of the surroundings, the music, and everything which can occupy the mind in an agreeable way.—*The Practitioner*, 1897, No. 351, p. 235.

Poisoning from Airol.—DR. FRITZ SEMMER reports a single instance from the use of this drug, which is bismuth oxyiodogallate. About an ounce of a 10 per cent. emulsion, made with equal parts of glycerin and olive oil, was injected into a psoas abscess, after removal of its contents, resulting from tuberculous spondylitis. Severe burning pain was experienced shortly after the operation, which latter was followed by headache and coryza, such as has been observed to follow the administration of iodine. These symptoms disappeared after making use of sodium bicarbonate. Three days later there was observed a swelling of both lips and severe *factor ex ore*. For the past twenty-four hours there had been burning pain in lips and gums, so that swallowing caused severe pain. Headache, malaise, inappetence, and nausea were also present; the movements were somewhat constipated, the temperature afebrile. The gum-margins showed a bluish-gray discoloration, and the hard palate about the teeth was bluish; the throat was slightly reddened, the border of the tongue bluish, while the tongue itself was heavily coated. The buccal mucous membrane was marked by dark blue lines and showed the impress of the teeth. The mucous membrane of the under lip was covered with similar spots, in the centre of which were small, coated ulcers. Pressure upon the teeth caused pain. The submaxillary glands were slightly swollen and sensitive. The urine was dark in color, contained a white sediment of urates, but was free from albumin. The ulcers healed under the use of potassium chlorate, although the discoloration persisted more than four weeks. Eight days from the last the symptoms required another emptying of the abscess. When this was done the cavity was found to contain some of the airol emulsion, which, being removed, was followed by a rapid disappearance of the symptoms and a clearing up of the urine. The explanation of these symptoms is to be found in the fact that bismuth is soluble in glycerin.—*Correspondenzblatt für Schweizer Aerzte*, 1897, No. 16, S. 486.

The Therapeutics of the Thyroid Gland.—MR. H. GIDEON WELLS states that when the thyroid preparations are administered to animals experimen-

tally or to man therapeutically, effects are produced which can be separated into two classes: (a) Nutritional: The process of metabolism throughout the body undergoes a marked change, which is shown best by the urine. This is considerably increased in quantity, it contains a greater amount of urea, as well as chlorides and phosphates, as has been shown experimentally by Roos, and clinically by Napier and others. At the same time the weight of the subject diminishes, particularly if it be above normal because of fat deposition. This decrease in weight is constant and considerable, and Wendelstadt has been able to demonstrate that but one-sixth of the loss can be attributed to the nitrogenous compounds as shown by the increased nitrogen content of the urine, the rest being due to loss of water and of the fat itself through oxidation. (b) Nervous: Of these the most prominent clinically is the palpitation of the heart, which is a certain indication that the dosage has been carried too far. With it come headache, nausea, and vomiting, and if the remedy be pushed still farther the pulse and heart weaken to a dangerous degree. Sometimes glycosuria is produced, which can be attributed to some action on the diabetic centre, since it may develop into a true diabetes mellitus. Schäfer has also shown that if thyroid extract be injected into the veins of healthy dogs, there follows an immediate fall of blood-pressure, without any considerable change in the rate or force of the heart-beat, due to dilatation of the vessels throughout the body. Passing over myxœdema and cretinism, in which the good effects of the administration of thyroid extract are acknowledged, of 584 cases of simple goitre about 82 per cent. were relieved. From his analysis of goitrous glands the suggestion is made that not only does the normal American gland contain a much greater amount of iodine than does the German gland, but also that this amount is necessary to inhabitants of this country, so that the gland will hypertrophy to keep the iodine content up to the standard, as was shown in the report of two cases of the hyperplastic variety, from patients of foreign birth, but who had been for many years resident in this country. In both the iodine content was close to the American average. Exophthalmic goitre generally becomes much worse under this treatment, and the patient is relieved on its cessation. In obesity this failed to produce some improvement in but six of 145 cases. This, however, is not permanent, except in a few instances, unless the patient adheres to a system of dietetics and exercise. In all probability, the benefits of this treatment are due to the increased metabolism in the tissues, producing the same results as vigorous and general exercise—*i. e.*, a burning up of the superfluous carbonaceous materials in the body. In insanity it seems to be of value as a cerebral stimulant when the higher cortical cells are anergic after attacks of acute insanity; but its use is conceded to be dangerous in acute mania and melancholia. Of skin diseases, scleroderma offers a more favorable field, and improvement in all cases (Bramwell and Abraham), but no cures are reported in lupus.—*Journal of the American Medical Association*, 1897, vol. xxix., pp. 897, 954, and 1007.

[It is of especial importance that patients who are taking preparations of thyroid should be carefully observed, and the dose be so regulated that no symptoms are produced. We have had under observation a patient from whom a goitre had been successfully removed, but to whom thyroid extract had been so unskillfully administered that her condition was far worse than

before the operation. Keeping the dosage within proper limits, or systematically intermitting the remedy, would have saved the patient from permanent disability.—R. W. W.]

Antivenine in the Treatment of Leprosy.—DR. ISADORE DYER instances Carreau's observation of a leper bitten by a venomous serpent, in whom there was marked disappearance of the tubercular lesions of the disease during recovery from the effects of the bite, and reports five instances of the use of Calmette's antivenine. The amount employed varied from one-fourth drachm to nearly three drachms, administered hypodermatically into the gluteal muscles, interscapular space, or, exceptionally, into selected leprous lesions themselves. At first the injections were made every second day; subsequently every day. Sterilization of needles and syringes, with antiseptics of hands, was made a routine practice. The results are as follows: (1) Number of injections, 42; cold sweats were the only reaction. Improvement began after the fourth injection. The changes particularly noticed were in the disappearance of infiltration from the face, the resorption of tubercles on the face and of the ear, the restoration of the eyelids from the ectropion, and the return of a normal and natural expression. Whenever local injections were made into individual lesions, the lesions disappeared. (2) Number of injections, 28; these proved to be of no benefit. The patient suffered pain at each injection; seemed to grow anæmic, and lost weight so long as the treatment was continued. (3) Number of injections, 17. This patient improved steadily from the fifth injection. There was no reaction from the treatment, and the lesions have practically disappeared. He has regained the full use of forearm and hand, which were affected, and except for a faint rosiness where the lesions were, and occasional stiffness of two fingers, there is no evidence of the original disease. (4) Number of injections, 18. The characteristic macular patches have lost all of the original livid coloring; they have broken in contour, the borders being now quite irregular and fading rapidly from the edges. The maculae are made up of grayish, irregular spots, distributed over an area of skin healthy in color; the infiltration in these patches has gone; the sensation, which at first was absent, has returned, so that the injections are painful. The patient has now sufficient use of hands to allow active work, formerly impossible. (5) Number of injections, 10. This patient improved after the first injection, notably as to the eruption on the face. In short, in four of these patients there was marked improvement; in one there was a practical disappearance of the lesions present. In one only was there failure, and here the age and frailty of the patient must be considered.—*New Orleans Medical and Surgical Journal*, 1897, No. 4, p. 1177.

[Calmette's antivenine is undoubtedly the most reliable. We hope that this report will encourage further investigation.—R. W. W.]

The Treatment of Trismus and Tetanus.—DR. TH. WEISCHER reports two successful instances of the use of Behring's serum. In seventeen years there have been observed in the Cologne hospital twelve cases of tetanus and six of trismus and tetanus without manifest cause. *Of these ten died.* Omitting the two instances here reported, the death rate was 62.5 per cent. Of ninety-eight cases collected from the literature which received tetanus

serum, forty-one died, which is a mortality of 41.8 per cent.—*Münchener medicinische Wochenschrift*, 1897, No. 46, S. 1284.

DR. G. O. COFFIN reports a single instance. Treatment was begun by the injection of half an ounce of this serum six days after the disease had begun. This amount was repeated one or more times daily, and in addition morphine sulphate, chloral, and sodium bromide were administered. The patient recovered.

DR. J. W. FOSTER reports an instance where the treatment was commenced four days after the onset of the disease, and thirteen days after the reception of the injury. In addition chloral, potassium bromide, cannabis Indica, and hyoseyamus were administered. The disease reached its climax about the tenth day, and then gradually subsided.—*Therapeutic Gazette*, 1897, No. 11, p. 734.

[In the last two cases the evidence is strong that the antitetanic serum exerted a marked influence for good and materially aided recovery. Of course, each received active medication in addition, which prevents the evidence from being conclusive, yet these are among the most convincing of the cases hitherto reported.—R. W. W.]

Bone-Marrow.—DR. P. MUSETIER, noting the effect of bone-marrow in hæmatopoiesis and the part which it plays in the constitution of the blood, and notably in the formation of the white corpuscles, believes that it would be natural to make use of this substance in simple anæmias. Already Brown-Séquard has made use of extract of spleen with this after severe hemorrhage, whether experimental or accidental, and in chlorotic or anæmic subjects. Instances of its successful use in pernicious anæmia have already been reported. In seven cases of chronic paludism good results have been reported from the use of the two substances. So also in leucocythæmia, when arsenic had failed the results were excellent, although relapse occurred after cessation of the treatment. Apparently in the secondary anæmias and particularly in chlorosis, the results have been most satisfactory.—*Bulletin Général de Thérapeutique*, 1897, 8e liv., p. 289.

Sanose.—DRS. SCHREIBER and WALDVOGEL report upon this albumin preparation, which consists of 80 per cent. casein and the remainder albumose. It occurs as a white, odorless, tasteless powder, which forms an emulsion with water. It may be administered in milk or cocoa (2-5 to 50), or in bean soup, about a drachm to the spoonful. It can also be added to nutritive enemata. Fourteen instances of its use are cited, showing changes in body-weight, total nitrogen, urea, uric acid, phosphoric acid, and daily amount of urine.—*Deutsche medicinische Wochenschrift*, 1897, No. 41 (Beilage), S. 65.

[This preparation promises much; its taste is by no means unpleasant, and thus far our use of it has been satisfactory.—R. W. W.]

Eucaine in Pediatrics.—DRS. A. BAGINSKY and P. SOMMERFELD report two instances of its use, the observations being carefully carried out. They conclude that this substance does not disturb digestion; the nitrogen output is somewhat increased, while the uric-acid excretion is markedly diminished by its use, and that it is as useful a food for children as are other albumins, as meat and egg-albumin.—*Therapeutische Monatshefte*, 1897, Heft 10, S. 516.

Somatose as a Galactagogue.—DR. RICHARD DREWS, from an extended experience, recommends this substance whenever the milk is checked from disease, mental or other disturbance, or when, although the glands are well developed, they do not secrete properly, in order to avoid the danger of the artificial feeding of children. Naturally, if the mother is suffering from a disease during which she should not nurse, this remedy should not be used.—*Therapeutische Wochenschrift*, 1897, No. 45, S. 1157.

Olive Oil in the Treatment of Typhoid Fever.—MR. OWEN F. PAGET has attended more than one hundred patients suffering from this disease, who were placed under the most disadvantageous circumstances, without deaths. He injects by the bowels from quarter to half a pint for the first four or five days, at intervals of from twelve to twenty-four hours. After the fifth day it may be given every second day, or left off entirely if the patient is having natural motions at least every twenty-four hours, and if the temperature is steadily falling. If there is great intestinal accumulation and the bowel is paralyzed, the oil should be given by the mouth, a cupful at a time, until the bowels respond; then the injections will suffice.—*The Lancet*, 1897, No. 3874, p. 1383.

[The principle which underlies all successful treatment in this disease—to limit the results of the infection at its point of greatest activity—is so frequently lost sight of that it is worth while to note the various methods of accomplishing this.—R. W. W.]

Stimulation of the Gastric Mucous Membrane to Aid in the Absorption of Important Drugs.—DR. H. A. HARE reports his clinical observations based upon the results obtained from four patients. Cachets containing three grains each of potassium iodide were administered to patients, none of whom were suffering from any known gastric lesion or functional disturbances, and convalescent. The saliva was tested every two minutes until the iodine reaction was found. Several days later the cachets, with the same amount of the iodide, to which was added one grain of powdered capsicum, were administered to the same patients. Three of the four showed a decided gain in the time required to give the iodine reaction in the saliva. It is evident, therefore, that the use of a gastric stimulant aids very materially in the absorption of the other drug, and the moral would seem to be that whenever it is possible it is well to combine with that drug some gastric stimulant to aid in its absorption. This is particularly necessary if there is any reason to believe that the stomach is in a state of atony, as evidenced by a relaxed tongue and a history of excessive eating or drinking or chronic catarrh.—*Therapeutic Gazette*, 1897, No. 11, p. 731.

The Value of Belladonna in the Treatment of Chronic Constipation and Lead Colic.—DOTT. GAETANO TRAVERSA, from an elaborate study, concludes that in lead colic, whether due to direct excitation of the intestinal ganglia, or of the abdominal fibres of the vagus, or to simple accumulation of hard and dry feces in the intestine, from reflex action upon the contraction of smooth muscular fibres consecutive to primary irritation of the sensory nerves, belladonna or its alkaloid, by diminishing, more or less completely and in different degrees, the irritability of the peripheral nervous apparatus,

takes away an indispensable factor whereby abnormal stimuli operate through the nerves in increasing the contractility of the smooth muscular fibres. After careful investigation, it is evident that neither belladonna nor atropine is indicated in the treatment of constipation dependent upon intestinal atony. They can be used with advantage, however, in all the painful and spasmodic attacks which result from hyper-excitability of the nervous apparatus which presides over the contraction of the intestine.—*Il Policlinico*, 1897, No. 24, p. 601.

Tannoform.—DR. CARL SZIKLAI has successfully treated forty children, suffering from intestinal catarrh, with this remedy. He administers one-sixth to one-half a grain, according to the age of the patient, and usually two or three doses will check the diarrhoea, but rarely so many as ten will be required. In adults, intestinal catarrh, even diarrhoea of the tuberculous, and dysentery, yield to this remedy; in the last a preliminary dose of castor oil should be given. Its favorable effect in hyperidrosis when used as a dusting powder is commented upon.—*Therapeutische Wochenschrift*, 1897, No. 41, S. 1050.

[Our own observations seem to indicate that this drug is too irritating for internal use.—R. W. W.]

Holocaine in Ophthalmology.—M. J. CHEVALIER finds no difference between the anæsthetic action of this substance and that of cocaine as ordinarily used. Forty-two operations have been performed, using a 2 per cent. solution by instillation. In case of ectropion or chalazion, fifteen minims of a 1 per cent. solution were injected. For instillation four or five drops are used, later three or four immediately before the operation, and this must frequently be repeated during it, for the effect seems to last about ten to twelve minutes. The solution should be prepared in a porcelain capsule with hot distilled water, and thus prepared will keep indefinitely, although it gradually diminishes in anæsthetic power. In the same amount it is more poisonous than cocaine, but since it is used in weaker solutions it can be employed with a greater sense of security. On the other hand, outside of ophthalmic work, it should be administered with great caution if large amounts are necessary, for death occurs without prodromes. Anæsthesia comes on rapidly, generally within a minute and one-half. Even in inflamed eyes anæsthesia appeared as usual. It apparently has no effect on the vasomotor system, nor does it change the tension, but there comes dilatation of the pupil. It apparently does not dry or otherwise injure the cornea.—*Bulletin Général de Thérapeutique*, 1897, 20e liv., p. 609.

A Caution Against the Use of Kerosene in the Treatment of Pediculosis Capitis.—DR. MAURICE EDEN PAUL comments upon one of the more convenient methods of treating this condition. Kerosene instantly destroys the lice, loosens the nits, and soothes the cutaneous irritation. The recent death from burn consequent on the spontaneous igniting of hair that was being washed after the application of a lotion consisting principally of kerosene, makes it necessary, however, to reject this as a parasiticide. In this instance the ignition was not brought about by any naked light, and

it is suggested that an explosive mixture of air and kerosene vapor was formed in the interstices of the hair, and was then ignited by an electric spark formed by the friction of the hair.—*The Lancet*, 1897, No. 3874, p. 1385.

Capitol.—DR. G. EICHOFF reports that this is a condensation product of tannin and chloral, which occurs in a dark-brown, hygroscopic powder, with difficulty soluble in cold, but readily in warm water and alcohol, and which is decomposed by alkalies. It combines the astringent action of tannin with the antiparasitic of chloral. It is used in seborrhœa in a 1 or 2 per cent. solution in alcohol, as a lotion for the hair twice daily. Within one or two weeks the scales disappear, the secretion from the sebaceous glands lessens, and the falling of the hair ceases. It apparently possesses no disadvantages and can be used as a prophylactic.—*Deutsche medicinische Wochenschrift*, 1897, No. 41.

Hyoscine Intoxication.—DR. AUGUSTUS A. ESHNER reports that after the hypodermatic injection of one-hundredth of a grain there was extreme muscular weakness, loss of consciousness, flushes of face, a hard, tense, full, and rapid pulse, noisy, rapid respirations, twitching of hands, moist skin, and cool and free perspiration. Nine hours later the patient was unable to recall anything of the events which had transpired. The urine contained no albumin, but numerous hyaline and granular casts, which had been noted on previous occasions.—*Therapeutic Gazette*, 1897, No. 10, p. 668.

Poisoning by Trional.—M. FONTYNOT, in the course of a paper on the pharmacology of this drug, states that it is not very poisonous; about one and one-half times as poisonous as sulphonal. Two drachms in one instance and four in another have been taken without fatal results. There is, however, a chronic poisoning, perhaps more serious, which is brought about by too long duration of treatment without interruption, constipation, which favors its accumulation, sex (the female sex being more sensitive to the action of hypnotics), and finally the dose ingested. The symptoms are an obstinate constipation, diminished quantity of urine, nervous disturbances, and hæmatoporphyria. The last is recognized by the empyreumatic odor of the urine, which resembles that of acetone, and its dark-red color by reflected, and reddish-brown by transmitted, light. Yet it should be added that the presence of hæmatoporphyrin in the urine is not necessarily a sign of trional-poisoning, for it has been observed when neither trional nor sulphonal has been absorbed.—*La Presse Médicale*, 1897, No. 95, p. 307.

What Causes Copaiba and Other Symptomatic Rashes?—DR. DAVID WALSH notes that this drug has often obvious effects upon the skin and that it is excreted by the lungs and kidneys. It is also an epithelial irritant, but its action appears to be greatly influenced by the susceptibility of the individual. Assuming that symptomatic dermatitis ensues as a part of a general excretory action, the practical conclusion is obvious that any drugs which cause mischief to the skin should be given with great caution, lest they injure other organs.—*Medical Press and Circular*, 1897, No. 3058, p. 607.

MEDICINE.

· UNDER THE CHARGE OF

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Pulmonary Tuberculosis Following Traumatism.—All the cases of so-called traumatic pulmonary tuberculosis hitherto reported have been unsatisfactory in showing the relation claimed. DR. O. SCHIRADER (*Berlin. Klin. Wochenschrift*, 1897, No. 46) furnishes an account which leaves little to be desired. A healthy man, aged twenty-nine years, with no tuberculosis in the family history, fell heavily on the right side of the back. The fall was so severe that the patient was unconscious a quarter of an hour, and felt ill afterward. The next day he began to work again, but was obliged to give up, and was admitted to the hospital with signs of pneumonia in the upper and middle lobes. The consolidation continued, with a remittent fever. In the beginning the sputum was negative, but on the fortieth day after the fall tubercle bacilli were found. By another month the fever disappeared. Soon after the physical signs had improved so much that only slight loss of resonance could be detected. Bacilli could not be found. [Treatment not described.]

The author inclines to the belief that the pneumonic process was tuberculous from the beginning, basing his opinion largely on the fever type. [The temperature curve as given might be that of sepsis.] Whether the patient already had a latent tuberculosis, or became infected after the injury, perhaps in the hospital, the author does not say. The course of the symptoms, the seat of the lesions, and the accuracy of the observation go to support the author's claim as to the relation of the injury to the disease.

An Albumose Substance in the Urine in Sarcomatosis of the Bones of the Trunk.—ROSIN (*Berliner Klin. Wochenschrift*, 1897, No. 48) reports a case in which the patient for many weeks excreted in the urine a substance which had the general characteristics of an albumose. The more minute chemical details the author proposes to describe elsewhere. The patient was a woman of thirty-six years, the clinical diagnosis, nephritis with albumosuria and central hypoglossus and trigeminus paralysis. Autopsy revealed amyloid, fatty, and necrotic changes in the kidneys, without nephritis. There was a new growth affecting many ribs, originating in the marrow, identified as myelogenic round-celled sarcoma. The ribs were softened as in osteomalacia, but without deformity.

The most interesting feature of the case was the excretion of albumose. This could evidently not be due to the renal disease. An examination of the

literature makes it very probable it was related to the disease in the bones. Since the case of Bence Jones, usually described as one of osteomalacia, six cases have been described in which the two things occurred together. From the results of the later examinations it seems clear that all of these were cases of multiple sarcomatosis rather than osteomalacia properly speaking. It seems also that sarcoma of the bones of the body, especially the ribs and vertebræ, is associated with albumosuria, while sarcoma of the face and extremities is free from it. Later investigations must determine whether the albumose substance is formed in the tumors and then excreted with the urine, or if it comes from the blood-serum.

Symptoms Due to Intestinal Parasites.—E. PEIPER (*Deutsche med. Wochenschrift*, 1897, No. 48) gives a number of interesting details on this subject. A case in which severe symptoms, resembling those of meningitis, rapidly disappeared after the expulsion of a number of round worms serves to introduce some remarks on the possible explanation of such cases. The common explanation is that the nervous symptoms are reflex, due to irritation by the worms in the intestine. Peiper does not deny the possibility of this, but thinks that another explanation is more probable, namely, that the parasites produce poisons which act on the nervous system. Peiper gives due credit to Von Linstow for his researches on the toxicity of the helminths. The older literature contains many references to the dangers of ascarides. Many modern authors report cases in which severe symptoms seemed due to no other cause.

So, attacks of severe opisthotonos (Lutz), hysterical convulsions (Mosler), hydrocephalus symptoms, with hemiplegia (Eichberg and others), even fatal nervous symptoms with those of ileus (Mosler), severe anæmia (Baelz, Leichtenstern, and others), have been traced beyond doubt to these parasites. As to the presence of toxic substances von Siebold mentioned attacks of sneezing, lachrymation, and itching and swelling of the fingers after handling ascarides. Huber and Küchenmeister have mentioned the peculiar odor of the round worms, and Leuckart, who observed that it was extracted by alcohol, supposed it might reside in an oil. Von Linstow and Raillet have each noticed swelling of the conjunctiva after working with ascarides. Arthus and Chanson, who found an irritating substance in ascarides from a horse, found that 2 c.cm. of the juice of such a worm produced violent symptoms and finally death in a rabbit. Why severe toxic symptoms are not oftener observed in cases of ascariasis is difficult to explain. Perhaps duration of the disease and number and activity of the parasites are important.

Many interesting details are given regarding the toxic symptoms due to tapeworm and echinococci. Brieger obtained the platinum salt of a substance in echinococcus fluid that was fatal to mice. In the case of tricocephalus, and also of oxyuris, the observations have not been carried as far as with some of the preceding, but the symptoms of trichinosis point to a toxic influence. Experiments with the feeding of intestinal worms to animals show a great toxicity. Further experiments are promising of important results.

Pyogenic Cocci in the Blood in Pulmonary Tuberculosis.—HIRSCHLAFF reports from Stadelmann's clinic (*Deutsche med. Wochenschrift*, 1897, No. 48)

along with some investigations on mixed infection in various diseases, some results in phthisis that are of interest in connection with previous reports of various observers. The author examined thirty-five cases of pulmonary tuberculosis, in which remittent fever seemed to indicate a mixed infection. He cultivated blood taken with aseptic precaution from the median vein on various media. Positive results were obtained only four times. This is in striking contrast to the results of Michaelis, who found cocci eight times in ten cases. In Hirschlaff's cases staphylococci were obtained of very low virulence. This is interesting in connection with the fact that metastatic abscesses did not occur in these cases. The author thinks the cocci came not from the lung parenchyma, but from cicatricial tissue, as Spengler found in cases of streptococcus and diplococcus mixed infection.

A Symptom-complex Resembling Peritonitis in the Last Stage of Addison's Disease.—W. EBSTEIN calls attention to a condition which he has seen several times in patients with Addison's disease. In fact, the first case he saw was one in which Addison's disease was not made out during life, but the adrenals were post mortem found to be tuberculous. The patient began to complain of tenderness over the right half of the abdomen. There was a diffuse resistance to the right of the umbilicus. Along with a pseudo-membranous augina there were diarrhoea, dyspnoea, anxiety, and collapse. The patient died in ten days after the onset. There was no discoloration of the skin. In a second case the diagnosis of Addison's disease was also by no means clear. The patient died after the onset of acute symptoms lasting a week, with pain and retraction of the abdomen, pain in the knees, heels, and finger-tips, vomiting and subnormal temperature. The adrenals were cheesy; there were fresh tuberculous lesions in the abdominal lymph-glands; pigmentation of the mucosa of the intestine. In the third case there was pigmentation of the skin. Chills, pain in the extremities, and pain in the side introduced the final illness. Eleven days before death severe and frequent vomiting began, with diffuse pain in the abdomen and rigidity of the abdominal muscles. As in the other cases there was but little elevation of temperature, pulse up to 100, urine free from albumin and sugar, quantity 1800 c.cm. Post mortem were found cortical atrophy of both adrenals, swelling of all lymphatic organs, slight retraction of the apices of the lungs, narrow aorta, hyperæmia of most of the abdominal organs. There was no induration around the adrenals or in the celiac plexus. In a fourth case no autopsy could be obtained.

All the patients were men, between twenty-seven and thirty-three years of age. In all consciousness was preserved to the end. There were no symptoms except those noted in the second case. Diarrhoea was not present in the final stage. No anatomical cause for the terminal abdominal symptoms could be discovered. The chief lesson of the observations at present is that symptoms like those described should lead to the consideration of adrenal disease, even if the characteristic pigmentation is not present.—*Deutsche med. Wochenschrift*, 1897, No. 46.

A Case of Amnesia.—KNAUER (*Deutsche med. Wochenschrift*, 1897, No. 46) reports an interesting affection. The patient was an intelligent woman,

thirty years of age; a cultivated musician, whose father, also highly intelligent, was the subject of nervous and mental diseases. The patient had Graves's disease and was hysterical. Suddenly, at night, she lost her sense of sound and musical-tone pictures. There was ringing in the ears, dizziness, choking paroxysms, headache, attacks of unconsciousness without aura, diminished hearing in both ears, and sleeplessness. Frequently ringing in the ears would pass over into melodies, as in the case of the composer Schumann. If one person spoke, she was sometimes able to understand; if several spoke at the same time, only a confused buzzing was heard. The resemblance of many of these symptoms to the group described by Ménière is very great. The author also alludes to the possibility of their being due to thyroid intoxication. The symptoms relating to the musical sphere are of a different kind. These consist in a music- or tone-deafness. Ability to sing was present, but impaired. Corresponding to the disturbance in the aphasic complex known as paraphasia, the condition could be called para(notographia. It would, perhaps, not be erroneous to say that the tone and word-picture centre and the tone and word-motor centre are close together, the former in the first left temporal, the latter in the third left frontal convolution. These relations are made clearer by a schema and a diagram of the convolutions concerned. The short but important article has a list of references to other articles on the same subject.

Cardiac Hypertrophy in Arteriosclerosis.—HASENFELD (*Deutsche Archiv für klin. Med.*, Bd. 59, p. 193) has made an investigation of this subject in the Leipsic pathological and clinical laboratories. The details are of great interest, but, with the tables, must be consulted in the original. The conclusions are as follows:

Even physiologically, the splenic, hepatic, and superior mesenteric arteries have a small amount of connective tissue in the intima.

Arteriosclerosis of mild or moderate degree, only microscopic, is quite common in the splanchnic arteries, but marked sclerotic changes are much less common than in the aorta, the arteries of the extremities and the brain.

Sclerosis is usually most marked on the main trunks of the splanchnics, and becomes less in the branches.

Arteriosclerosis only leads to hypertrophy of the left ventricle when the splanchnics or the thoracic aorta are severely affected. Arteriosclerosis of the other vessels does not seem to have such an effect.

In the five cases of contracted kidney examined, all the chambers of the heart were hypertrophied. If at the same time there was marked sclerosis of the splanchnics, the hypertrophy was most marked in the left ventricle. Extreme sclerosis of the aorta would probably have the same effect.

Should further examinations confirm the results now given as regards the uniform hypertrophy of all parts of the heart, we must conclude that the cause of hypertrophy in contracted kidney increases the work of both sides of the heart and probably excites the heart to increased activity.

The Impossibility of Immunity against Influenza.—Clinical experience shows that influenza not only does not confer immunity against future infection, but actually seems to favor it. This is confirmed by animal experi-

ments carried on by DELIUS and KOLLE (*Zeitschrift für Hygiene*, Bd. xxiv.). By what must be considered a remarkable exhibition of skill and perseverance, they cultivated large quantities of influenza bacilli in pigeon-blood and bouillon and on blood-agar. With these cultures—less readily with filtrates—they were able to kill guinea-pigs with symptoms resembling those of cholera, typhoid fever, etc. By none of the known methods were they able to produce immunity. In guinea-pigs, rabbits, dogs, sheep, and goats a certain degree of resistance was obtained against the poison, but neither anti-toxic nor bactericidal effects were obtained.

A Case of Alcaptonuria.—HIRSCH (*Berliner klin. Wochenschrift*, October 4, 1897) reports a case of alcaptonuria in a young girl, aged seventeen years, who, for eight days, had suffered from gastro-intestinal catarrh. Nausea and vomiting were the chief symptoms complained of when the patient came under observation. These were associated with slight elevation of temperature.

On the morning after admission the urine presented a brownish-black color similar to that seen in carbolic acid poisoning. When first voided the urine was browner or darker than normal, the color deepening on standing. Some of the urine was allowed to stand overnight. The following morning the urine was still acid in reaction and had become an inky-black color. It was so dark that the intensity of the color was not increased by the addition of alkalies, as is usually the case in this condition. The total amount of urine for the first day that this peculiar feature was observed was 700 c.cm.; reaction weakly acid; sp. gr. 1018. There was no albumin. Fehling's solution was reduced when heat was applied. Nylander's test was negative. Prof. Siegfried extracted an acid from the urine which gave the following reactions: 1. Alkaline solutions of the acid took on a dark-brown color. 2. Ammoniacal silver solutions were reduced in the cold. 3. Fehling's solution was reduced on the application of heat. 4. Very dilute solutions of chloride of iron produced a transitory blue color. 5. The acid yielded a lead salt, which was slightly soluble in cold water. From these reactions it was concluded that the substance in the urine giving rise to them was alcapton.

On the fourth day, after the peculiar darkening of the urine was first noticed, these features entirely disappeared, and the urine became once more normal. The patient had never noticed the same darkening of her urine before, and there was no family history of the disease.

Boedeker first described the condition in 1859, and called it alcaptonuria. The chemical substance causing the change in the urine is believed to be one or the other of the two following acids: (1) uroleucinic acid (Kirk), or (2) homogentisinic acid (Bannmann).

Hirsch gives the following as the interesting features in this case: 1. The appearance of the alcaptonuria during an attack of acute gastro-intestinal catarrh.

2. The short duration (three days).

3. In spite of the urine remaining weakly acid the color deepened so intensely that there was no increase in the depth of color after the addition of an alkali.

Phthisis and Child-bearing.—TOWNSEND (*Boston Medical and Surgical Journal*, October 14, 1897, p. 391) draws the following conclusions from the study of twenty-four cases of pregnancy in patients suffering from pulmonary tuberculosis:

1. Conception may take place even in advanced pulmonary tuberculosis.
2. The disease is generally held in abeyance during pregnancy, although it may advance or even originate at this time.
3. Labor is short and easy in proportion to the severity of the disease.
4. During the puerperium a rapid advance, leading in some cases to speedy death, occurs; or the disease may originate at this time. In either case the temperature-chart suggests puerperal sepsis.
5. Premature labor is more common the more advanced the disease, although pregnancy often goes on to full term even in advanced cases.
6. The average weight of the full-term children and their general condition at birth are not markedly below those of children of healthy mothers, except in the rare instances of congenital tuberculosis.

SURGERY.

UNDER THE CHARGE OF

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Temporary Intra-abdominal Compression of the Aorta above its Bifurcation in Operations for Pelvic and Abdominal Tumors.—In connection with the details of a successful operation for double malignant ovarian tumors, with many adhesions, LENNANDER (*Cent. für Gynäk.*, No. 17, 1897) describes a method of digital intra-abdominal compression of the aorta which he employed with very gratifying results. The deductions which he draws from this case are the following:

1. A wide compression on the aorta above its bifurcation makes the entire true pelvis practically bloodless.
2. If the common iliac artery is compressed on the vertebræ or the os sacrum above the sacro-iliac synchondrosis, the half of the pelvis is rendered nearly bloodless.
3. The compression was employed for three-quarters of an hour in this instance, with no serious effects; it should not be necessary longer.
4. When the compression ceases, a rapid lowering of the heart's action, due to vasomotor dilatation, should be guarded against by a normal salt solution, intravenous injection.
5. In resections of the spleen or the extirpation of a fixed spleen, the arteria

linealis at the upper end of the spleen may be compressed against the vertebræ.

6. In severe and difficult operations upon the kidney, where the peritoneal cavity is necessarily opened, the compression of the renal vessels against the vertebræ will be of service.

The author adds a foot-note of the fact, just discovered by him, that Senn had previously suggested intra-abdominal compression of the aorta in military surgery.

Solid Tumor of the Mesentery.—HARRIS (*Annals of Surgery*, July, 1897) reports a rare case of tumor of the mesentery which weighed five pounds, and proved on microscopic examination to be a "lympho-sarcoma flexiform with colloid degeneration."

The tumor was situated in the mesentery and was crossed by an entire loop of jejunum, which it was necessary to sacrifice in order to remove the tumor; it was resected on either side of the tumor, the tumor removed, and the gut united by end-to-end anastomosis. The patient, who was a boy, five years old, made an uninterrupted recovery, and was in excellent health ten months after the operation.

Gastrostomy for Malignant Disease of the Œsophagus.—The objects to be attained by this operation are the easy administration of food, its complete retention, and freedom from excoriation, coupled with a low mortality from the operative interference. These results BARLING (*Birmingham Medical Review*, June, 1897) believes can be best attained by Albert's operation. He has successfully performed this operation in three cases of malignant disease; one patient died subsequently from the spread of the disease; all had great relief and gained in weight, while none of them had any distressing symptoms.

The operation which he employed is the following: A nearly vertical incision about three inches long is made over the outer parts of the left rectus, commencing an inch or more below the left costal margin. The anterior layer of the sheath of the rectus is opened, the muscular fibres are separated and pushed to the outer side, and the posterior layer of the sheath and peritoneum are divided. The stomach is exposed at once, as a rule, but care must be taken that the transverse colon is not picked up by mistake. A pouch of the stomach, as near the cardiac end as can be conveniently managed, is then pulled into the wound, and a running suture passed around the base of the pouch stitches it to the parietal peritoneum and edge of the rectus sheath. The next step is to make a short transverse incision through the skin over the margin of the ribs about one and one-half inches above and directly in line with the upper end of the first incision. The bridge of skin between the two incisions is lifted up, the pouch of stomach is pulled under this bridge and its apex stitched to the small skin incision. A couple of stitches are first inserted, the stomach is then opened by a small puncture, two or more additional sutures are applied, and then a small tube is passed into the stomach and so fixed that it cannot slip in or out and that no leakage can take place through it. The main incision is then sutured so that the stomach is covered in. If very necessary, food may be administered at once,

but it is better to wait for some hours, lest vomiting should be induced after the anæsthetic.

Three Successful Operations for Thrombosis of the Lateral Sinus Following Otitis Media—**DAHLGREN** (*Arch. für klin. Chir.*, Bd. lii., Heft 3) reports in detail the following cases of thrombosis of the lateral sinus which were successfully operated upon by Lennander and the author:

CASE I.—Acute purulent otitis media following influenza. Empyema of the mastoid antrum with otitis and periostitis of the mastoid region, thrombophlebitis of the sinus transversalis, with pyæmia and abscess formation in the femur. After opening of the mastoid antrum, it was curetted and washed out; an exploring needle showed the absence of blood from the lateral sinus (the osseous wall was wanting); it was opened, found to be thrombosed, curetted; the internal jugular vein was ligated to prevent further spread of the thrombi, and the wounds then packed with iodoform gauze soaked in boroglyceride. The patient made a complete recovery and was entirely free from any further symptoms of phlebitis, thrombosis, or pyæmia.

CASE II.—Chronic purulent otitis media, with a cholesteatoma of the mastoid antrum and catarrh of the mastoid cells. Extradural abscess of the posterior cranial fossa, with thrombo-phlebitis of the transverse sinus and internal jugular vein. There was an accompanying incipient pyæmia. Staeké's operation was performed, and after ligating the internal jugular vein the lateral sinus was opened and curetted. The patient made a good recovery. The cause of the abscess-formation was the blocking of the middle ear by a polypus.

CASE III.—There was present inflammation of the mastoid following an acute otitis media, but without perforation of the drum of the ear. There was a phlebitis of the lateral sinus. The symptoms pointed to a simple otitis media, and show to what a grave degree the surrounding parts may become involved without perforation taking place or symptoms arising of a more severe character. The most intense inflammation was in the mastoid antrum, which apparently became infected late in the disease of the middle ear, and was intensified by the occlusion of the communication with the middle ear. The mastoid antrum was opened, curetted, the internal vein ligated, and then the transverse sinus opened and curetted. The patient recovered completely.

Cancer of a Movable Kidney.—**LEGNEX** (*Ann. des Mal. des Org. Génito-urin*, No. 6, June, 1897) reports an interesting case of primary cancer of a movable kidney. The patient had no pain and no symptoms other than an occasional appearance of blood in the urine, an increasing loss of weight, with increase in the size of the abdomen, where a tumor the size of an infant's head could be easily detected, occupying the right lateral half of the umbilical region. It was fluctuating and dull on percussion; it could easily be displaced into the lumbar region laterally, upward, and downward into the pelvis. Pelvic examination showed the uterus and appendages to be perfectly normal and that the tumor had no connection with them. The laparotomy disclosed the true nature of the disease and confirmed the diagnosis which had previously been made. There were no adhesions, and the tumor

was readily and rapidly enucleated. Glands were felt enlarged along the ascending vena cava, showing that, although no adhesions had taken place, lymphatic infection was undoubtedly present, making a return of the disease certain. The patient made a rapid and complete recovery, despite her poor condition, while there was very little shock from the operation. Microscopical examination showed the tumor to be a cylindrical epithelioma.

Certain Points in the Causation and Treatment of Spinal Curvature.—BARWELL (*British Medical Journal*, August 7, 1897) calls attention to the fact that many cases of spinal curvature arise from an amesial position of the pelvis. He describes his method of studying these deflections of the body from the perpendicular, and calls attention to the importance of their recognition and correction if certain cases of spinal curvature are to be corrected. A convenient method of judging the amount of amesiality is to have the patient strip to the hips, with the feet and ankles showing below; a plumb-line is then held in such a position that the surgeon standing directly behind sees it fall midway between the heels, the amount of deflection from the perpendicular can then be judged by the distance of the intra-gluteal fold to the right or left, or the distance of the trochanters from the median line. The relation of the spinal column to the line should also be carefully noted.

The author believes it to be impossible to correct a curve caused by this malposition while that condition continues. Success in correcting this deviation and bringing the base of the spine to a normal position will go far toward correcting the spine above by the very necessity of balance. In incipient cases this measure alone will suffice.

Mesenteric Cysts.—After a careful and comprehensive study of the literature of this subject, with the report of a number of interesting cases, both of his own and others, MOYNIHAN (*Annals of Surgery*, July, 1897) gives the following as the symptoms, diagnosis, and operative method of treating these rare tumors:

Cystic disease of the mesentery is much more common in women than in men. The only form of cyst found with perhaps equal frequency in the two sexes is the hemorrhagic, as one might suppose from the mode of origin. Dermoid cysts have been found only in women. The extremes of life are not exempt from this disease. Cases are recorded at the age of four months, of two years, of six years, and at the advanced age of eighty years, and of seventy-seven years, and seventy-three years. The size of the tumors are extremely variable. They are sometimes so small as to be of no clinical significance, to cause no symptoms, and to require no treatment. They are sometimes so large as by their mere physical bulk to cause death, as in a case that has been mentioned by Portal.

The tumor is generally rounded, more or less spherical in form, and may be of even outline, or may be lobed. The most prominent part of the tumor is generally near the umbilicus, perhaps most commonly is slightly to the right of that point, approaching it more nearly as the cyst enlarges. The umbilicus never becomes protruded. The most obvious and the most characteristic sign of the tumor is the mobility. A cyst can readily and with freedom be pushed over from one side of the abdomen to the other, and to a

less extent can be moved in a vertical direction. There is resonance all around the tumor and a belt of resonance across the tumor where the intestine crosses it. The author warns against the exploratory puncture; its dangers are readily recognized as too grave.

The cysts may be so small in size and so quiescent as to have no clinical symptoms or be of clinical significance, and may be discovered only during an operation or at a post-mortem examination. Other cases are classified under two headings: (1) Those in which the course is chronic, where complaint is made chiefly of an abdominal tumor. (2) Those in which the onset of acute intestinal obstruction first draws the attention of the patient or practitioner to the abdomen.

The symptoms in chronic cases are pain, which is more or less acute, depending on the rapidity of the growth of the tumor. The more rapid the growth the greater the severity of the pain, and *vice versa*. The pain is local in and around the tumor, and radiating to the flanks, groin, and thighs. As the result of pressure exerted on the intestine and the consequent partial closure of the canal, there are colicky pains, due to vermicular contraction of the hypertrophied muscular fibres as they attempt to overcome the obstruction. There may be, but most commonly is not any, tenderness of the abdomen.

Constipation is the rule, but the severity and duration of it will, of course, largely depend on the position, duration, and size of the tumors. There is sometimes vomiting, and very rarely there may be persistent and intractable diarrhoea.

The signs in acute cases are those of an acute intestinal obstruction, vomiting, complete constipation, distention of the intestine, and the usual affections of the circulatory and respiratory system. There is one symptom that is mentioned as occurring in both acute and chronic cases—general wasting, which is occasionally extreme, and is presumably due to interference with the lacteals of the mesentery.

The causes which have been suggested as bringing about acute obstruction are: Irritation of solar plexus by pedicle of cyst; compression of the intestine, amounting in some cases to gangrene; formation of adhesions and strangulation by them; onset of acute peritonitis, owing to the rupture of the cysts or pedicle, and strangulation over a band formed by the pedicle of the cyst, as in one of the author's cases.

The differential diagnosis is to be made from ovarian and parovarian cysts—this is a frequent error—tumors of kidney, liver, spleen, and pelvic tumors. Cysts of the urachus, pancreatic cysts, and lipoma of the mesentery are likely to be difficult of differentiation. A fluctuating tumor which lies at first laterally, but which, enlarging, tends to occupy the middle of the abdomen, which, pointing toward the umbilicus, is freely movable, especially in transverse direction, capable of rotation on its own axis, surrounded by a zone resonant on percussion and crossed by a belt of resonance, can be no other than a mesenteric cyst.

Unoperated cases terminate by retrogression or quiescence of the cyst; perforation into the intestine, and discharge through that direction; perforation into the peritoneum, and the onset of acute peritonitis; extreme emaciation and death; acute intestinal obstruction.

Operative interference is necessary in both acute and chronic cases. The cyst may be stitched to the abdominal parietes and opened and drained. The cyst may be removed either by cutting through the opening layers of peritoneum in the pedicle, inverting the edges, and applying a series of Lembert sutures, draining the peritoneum or not, according as may seem fit, or if no pedicle is found the peritoneum may be incised over the centre of the tumor, and the cyst enucleated.

The author believes that the choice of operation should depend upon the individual case. If the case belongs to the chronic group, and especially if there has been no serious general wasting, it would doubtless be more advisable and proper to remove the cyst altogether. If the case is very acute, the sooner the operation is completed the better. Even in this class of cases it might be advisable sometimes to remove the cyst, but as a routine practice, the author believes the less prolonged and simpler operation would be attended with a larger measure of success.

Stone in the Kidney.—LENNANDER (*Deut. med. Woch.*, Nos. 22 and 23, 1897) reports two particularly interesting cases of stone in the kidney which serve to illustrate the author's timely remarks upon the diagnosis and treatment of this condition.

Too frequently nephritic colic is the only symptom the general practitioner knows which would lead him to suspect the presence of a stone, yet, as has been pointed out by Rovsing, this should properly be called urethral colic, since it is produced by the passage of a foreign substance, not necessarily a kidney stone, through the ureter, and may occur in cases of tuberculosis of the ureter without the passage of an abnormal body. Such cases, of course, make one think of stone in the kidney, but they are not always associated with that condition.

Patients suffering from a pain localized in the lumbar region should always have their urine carefully examined. When a stone is present there are usually, but not always, traces of albumin and leucocytes present in the urine. Frequently blood can be seen with the microscope, or detected with the guaiacol test. After a careful and deep palpation of the kidney blood can usually be found in the urine; but even this may fail when the stone is firmly embedded in the parenchyma of the kidney. The substances to be looked for in the urine are albumin, red blood-corpuscles, and the so-called pelvic epithelium of the kidney.

The history of the case is of greater value. The family history should be studied for uric-acid diathesis or a previous history of various calculi in other members of the family. The pain experienced is then studied, ureteral colic is sought, then a fixed pain in the kidney region, which is increased by movements and shoots in varied and radiating directions—upward as well as downward into the leg and genital regions. Pressure, both anterior and posterior, over the kidney should produce pain. This often has the same character as that produced by motion. If the other symptoms of stone are present without this pain on pressure, there is the possibility, as Jordan Lloyd has pointed out, that the stone is impacted in the ureter. The ureter must then be carefully palpated, either through the abdomen, the rectum, or the vagina.

The determination of a stone in the ureter is an indication for immediate operation, as the sequelæ and the result of the stoppage of the urine are very serious, so far as the integrity of the kidney is concerned.

In the case of stone in the kidney, the indication for operation is less urgent. Since a nephrolithotomy in a non-suppurating kidney has a very favorable prognosis, it must be performed, especially in young or middle-aged persons, where there are no serious contraindications to a grave surgical interference. If suppuration is present at the same time, immediate interference is absolutely imperative. The longer the operation is delayed after the diagnosis is made, so much the worse is the prognosis.

The operation is performed by any of the usual lumbar incisions. The kidney is dissected from its surrounding fat and brought into the wound; the renal vessels are held with the fingers, or by forceps covered by drainage-tube. The kidney is carefully palpated, as is also its pelvis. If the stone is not detected by palpation, acupuncture is resorted to. When the stone is located an incision is made from the convex side of the kidney through the parenchyma down to the stone: if necessary, the kidney may be completely divided. After the removal of the stone the kidney is sewed with catgut sutures. The compression of the renal vessels is only necessary during the opening and removal of the stone, and should not be continued more than fifteen minutes. If the stone is so situated that it can be readily reached by an incision through the posterior wall of the pelvis, the author agrees that this would be better, as the bloodvessels do not have to be compressed. After the stone is removed and the pelvis carefully washed out and freed from all clot, the wound is closed by a continuous catgut suture. The wound is then drained by salol-gauze strips. This method places the patient in danger of the formation of a new stone in case a blood-clot remains in the pelvis of the kidney, but it does not risk a thrombosis of the renal veins or a loss of parenchymatous substance.

In all operations on the kidney there is danger of subsequent anuria. In order to minimize this danger the author advises the use of methods to increase the blood-pressure and decrease its density, and also to induce an acute hyperæmia in the sound kidney.

With this end in view he gives vigorous patients 800 to 1000 grammes of normal salt solution the evening before operation, injecting it subcutaneously, and an equal amount immediately after the operation, repeating the amount once or twice later, if necessary. Enemata of 400 to 500 grammes of a 9 per cent. salt solution, with 30 to 45 grammes of brandy, are given every three hours. As soon as the patient can retain it a milk diet is begun, with large amounts of water, care being taken to avoid the production of loose stools.

The opposite lumbar region is covered with a large warm poultice. If the pulse indicates it, subcutaneous injections of camphor are employed. Digitalin is used in minute doses hypodermically, not more than three-quarters to one milligramme being employed altogether.

The patient is carefully guarded from cold: the operation is performed upon a warm table, and the patient is put into a warm bed which is kept warm by warmed air from a spirit-lamp.

The author prefers a chloroform-ether narcosis, with ether as the principal constituent, since he believes that it has been proven that albumin-

uria and casts in the urine are more liable to follow chloroform than ether narcosis.

Beside the cases reported, the author has employed this method of after-treatment with success in a case of intermittent hydronephrosis with a movable kidney, and subchronic interstitial nephritis, in which he performed a plastic operation upon the ureter and pelvis of the kidney. Also in three severe nephrectomies, tubercular pyonephrosis in connection with stone, and a cancer of large size. The cases reported in detail are one of nephrolithiasis of obscure symptomatology, and probably congenital, the other a movable kidney, with catarrhal pyelitis and nephritis, from which he removed a large stone, and found an infection of pure coli bacilli.

Wound of the Superior Mesenteric Vein.—ROBSON (*British Medical Journal*, July 7, 1897) reports an interesting case of a young mechanic, aged twenty years, who was admitted into the hospital in a collapsed condition with all the signs of internal hemorrhage, pulse feeble, 190, temperature subnormal, skin pale, and covered with a cold, clammy perspiration. He was said to have vomited blood after the accident. He was found to be suffering from a penetrating wound of the abdomen, caused by the sharp end of a file without a handle, which, having caught in a revolving wheel of a lathe, was pushed through his clothes and abdomen. There was a small punctured wound a little above the umbilicus and almost in the middle line. The abdomen was nearly flat, with dulness in both flanks. Liver dulness was present, and there was resonance over the front of the abdomen.

The operation showed a profuse dark hemorrhage, but no injury of the viscera could be found. At the bottom of a deep wound posteriorly the superior mesenteric vein was found divided. The ends were ligated, the abdomen washed out with warm boric acid solution, drainage from the site of the wound, and then the abdomen closed. The patient made a good recovery. The escape of the viscera from puncture was noteworthy, and was probably due to the bluntness of the penetrating body. The hemorrhage into the stomach was due to a blow, but no puncture was discovered.

On the Immediate Reduction of the Angular Deformity of Spinal Caries.—JONES and TURRY (*British Medical Journal*, August 7, 1897) have followed up the work of Calot and have performed forcible reduction in eleven cases. In six complete reduction was obtained, two with great facility. In five cases only partial reduction was obtained.

Of the results they say: In not one of the cases, despite the complete or partial reduction of the deformity, has there been either paresis or paralysis following the operation, nor has there been in four cases which have been carefully watched for two months any untoward signs, either of suppuration or a renewed outbreak of tubercle in those cases in which we presumed it to be the *fons et origo mali*. We submit, then, that, although the method is still on its trial as to its ultimate results, it seems to afford a good prospect of reducing the deformity without incurring dangerous consequences.

They infer that the correct way of preventing the deformity from arising or increasing in Pott's disease is to maintain the spine in hyper-extension by a suitable support beneath it, and not simply to place the patient upon a bed

or straight splint, which favors rugging of the spine at the seat of disease and increase of intervertebral pressure.

On Stone in the Bladder and Operations for its Relief—In discussing the results which he has obtained in 133 operations for stone, CUNNINGHAM (*British Medical Journal*, August 7, 1897) says that not more than 3 per cent. of cases should be unsuitable for litholapaxy. The cases that are unsuitable he tabulates as follows:

1. Those with such condition of the passages that the lithotrite necessary for crushing the stone cannot be passed. In some children (seven reported cases) the urethra was too small.

2. The stone may be so large that the largest lithotrite will not lock on it; or it may be so hard that it will resist the greatest force that the instrument will bear or the operator be able to exert.

3. A stone in the bladder may be complicated with one or more in the membranous or prostatic portions of the urethra, which cannot be pushed back into the bladder; or the stone may be encysted, or may be complicated with a tumor of the bladder.

4. A state of affairs may exist that makes it desirable to establish complete drainage and rest the bladder after removal of the stone, such as extensive cystitis with ammoniacal urine, and especially if associated with stricture of the urethra.

5. Such a condition or irritability of the bladder that the organ will retain no fluids even under profound anæsthesia. The stone being clasped by its hypertrophied walls in this latter case, an expert might perform litholapaxy without increasing the patient's risk, but perineal lithotomy would have considerable advantages in such cases in allowing drainage and rest to the bladder.

Of the cutting operations, the author states most emphatically that he prefers the perineal method, and restricts the suprapubic to the following conditions: (a) exceptionally large calculi, and these would probably be better dealt with by perineal lithotrity; (b) encysted calculi; (c) and those associated with tumor of the bladder, which it is advisable to remove at the same time.

The Mechanical Treatment of Injured and Diseased Joints.—Taking as an example of an injury, the overstraining or spraining of a joint, KLEMM (*St. Peter. Med. Woch.*, 1897, No. 28) says that the extravasation of lymph and blood which takes place will be only partially absorbed if the joint is placed in absolute rest, while a part will become organized and will interfere with the action of the joint, which may finally become ankylosed, with wasting of the muscles. He calls attention to the fact that the extravasation takes place not alone into the joint, but the great intra-articular pressure also forces it out into the intermuscular spaces, where it later may become organized and interfere in this manner with the nutrition and function of the muscles and prevent motion in the joint.

Such a condition the author has observed and verified on post-mortem examination.

As treatment for these injuries he advocates massage with passive motion.

In contradistinction to certain authors he believes in commencing the massage immediately. The massage, beginning at the periphery and then extending to the joint, is not painful, and acts to remove the extravasated fluid which is the cause of the trouble. After the massage the joint is placed in a compressive cotton dressing, fixed upon a splint and placed in an elevated position. The massage is continued in daily sittings. After three or four days the splint is removed, and after the disappearance of the swelling passive motion is commenced, while the use of the joint is fully restored at the end of fourteen days. The time at which passive motion should be commenced is of great interest. It has for its purpose the prevention of atrophy in the soft structures of the joint and in the group of muscles which moves the limb. The elbow is a joint which is especially prone to these changes, and here the passive motion should be commenced on the third or fourth day. The author employs in giving the passive motions the Swedish method, where the patient offers a slight muscular resistance to the motion, believing that in this way the groups of muscles which are involved will better retain their strength. The application of cold is held to be of no value, or at least the anæsthetic effect is offset by the contraction of the capillaries, which prevents the absorption of the extravasation.

In cases complicated by fracture the author employs the same principle, and alternates with rest and fixation, passive motion and massage, which can be done if the fragments are kept in proper position by extension and counter-extension without injury, and in reality stimulate the reparative processes.

The author also finds massage of use in the treatment of various arthritides found in connection with infectious diseases, but applies it only in the acute stage and not to the resultant conditions of contraction and ankylosis.

In gonorrhœal arthritis and those forms of arthritis which occasionally appear in typhoid, measles, scarlet fever, smallpox, dysentery, and diphtheria, which are so varied in their nature and have the point of inception outside of the synovial membranes, the author would advise them to be let alone, and especially warns against massage in gonorrhœal arthritis, as it is liable to spread the infection and produce serious results.

He further advocates the use of massage in cases of arthritis due to fungoid tubercular granulations, but with special care in the differential diagnosis from the other forms—in chronic articular rheumatism, in deforming arthritis, as in arthritis deformans, tabes dorsalis, and syringomyelia; in acute diseases of the joints after the inflammatory process has subsided, with a view to preventing the later results of the disease upon the joint.

A Cheap and Serviceable Surgical Suture.—GEBAROFF (*Cent. für Chir.*, October 31, 1896) describes a new method for preparing ordinary linen thread for surgical use in such a manner that it does not kink, twist, or knot, and is readily rendered aseptic.

The thread is deprived of its fat by boiling in caustic soda, then washed in water and sterilized, and laid for a few days in alcohol. It is then placed in a 5 per cent. celloidin solution (Schering), with equal parts of alcohol and ether; from this solution it is laid out and allowed to dry while stretched. The threads contract and are shining, do not absorb water or twist, and may be readily threaded. The sutures may be sterilized, but cannot be kept

in alcohol, though they may be placed in bichloride or carbolic solutions. Sublimite 1 to 1000 may be added to the celloidin solution, making it antiseptic.

Hydrocele Bilocularis Intra-abdominalis.—VOLLBRECHT (*Arch. für klin. Chir.*, 1896, Band, lii Heft 2) describes an interesting case of this rare form of hydrocele. The swelling was pear-shaped, with the apex downward, and very large, extending from the bottom of the left scrotum to the height of the umbilicus and from the anterior superior iliac spine on the left to four-fingers' breadth beyond the median line on the right. It was dull on percussion, translucent, and fluctuating. A portion of the scrotal contents could be emptied by pressure into the abdominal portion. The line between the two tumors was formed by Poupart's ligament. The testicle was found below and posteriorly in the scrotum. There was present also a simple hydrocele of the tunica vaginalis testis on the right side.

The following operation was performed for the radical cure by PROF. MIKULICZ: An incision was made in the longitudinal axis of the tumor and three half-pints of fluid were withdrawn. The inguinal canal was found to be widely dilated, sufficiently so for the passage of two hands. An examination with the hand disclosed the fact that the wall of the sac was fibrous in character and very thick; the whole sac was lined with a serous membrane which was thickest in the intra-abdominal portion. The hand could reach nearly to the left kidney, but that organ could not be palpated on account of the thickened wall of the sac.

The serous lining was removed by blunt dissection and the sac closed. The enlarged inguinal canal was closed by Bassini's operation for radical cure of inguinal hernia. The wound closed after a little delay from serous discharge and the patient made a complete recovery.

From his study of this case and the literature of the subject, the author concludes that these hydroceles have their origin in the fact that the funicular portion of Giralde's organ does not entirely disappear, and that this particular form of hydrocele results from an anomalous growth of that portion of this organ.

Coxalgia should be Cured without Leaving any Limp in Walking.—CALOT (*La Méd. mod.*, November 4, 1896), in speaking of the treatment of coxalgia, says that of cases seen in the primary stage, ninety-eight out of the hundred should be cured without leaving a limp behind. The limp is consecutive, and is caused by shortening, by weakness of the limb, and by absolute ankylosis. Shortening is due to three factors—a vicious position, the displacement of the head of the femur into the iliac fossa, and atrophy of the limb. The two former may be easily avoided if the case is seen early; an atrophy in length cannot be always avoided, but it is an important factor, and does not need to be very great in order to produce shortening of itself. The weakness of the limb may be overcome by giving up splints and fixation as soon as possible, and beginning gymnastics, massage, and electrolysis. Ankylosis or extreme mobility the surgeon is responsible for. Ankylosis is extremely rare, and when it does occur may be overcome by special teaching, so that the patient is enabled to walk without limping.

OPHTHALMOLOGY.

 UNDER THE CHARGE OF

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Inequality of the Pupils in Health and Disease.—FRÄNKEL (Lyons) divides anisocoria into organic, functional, and physiological. Organic inequality is the expression of a direct or indirect lesion either of the third nerve or of the sympathetic. Functional inequality depends upon some indirect action upon the sympathetic; the third nerve is supposed never to be involved in this form. Certain rare phenomena, however, especially observed in hysteria justify the view that pupillary disturbances due to spasm or paralysis of the constrictor nerve do not necessarily imply an organic lesion, but may be functional. Physiological inequality is congenital, and not dependent upon any known condition. Organic anisocoria is due to a lesion situated within the eye, orbit, cranium, spinal canal, or elsewhere—*i. e.*, at the anterior roots of the eighth cervical, first or second dorsal, rami communicantes, the inferior portion of the brachial plexus or the cervical sympathetic, etc. Moreover, in traumatism or tumors directly affecting any point in the course of the pupillary fibres, inequality of the pupils is frequently observed from an influence exerted upon the sympathetic, and similarly in affections of the circulatory, lymphatic, and respiratory apparatus.

Functional inequality is practically always due to irritation of the sympathetic—*i. e.*, to a unilateral spasmodic mydriasis.

The pupils are unequal in many unilateral affections of the trunk or limbs, the larger belonging to the affected side. The inequality is only evident, as a rule, when the pupils are dilated and disappears when they contract.—*La Presse Médicale*, 1897, No. 77.

Exophthalmic Goitre.—J. A. SPALDING (Portland, Me.) reports a case in which, owing to excessive protrusion of the globes, the enucleation of both eyes became successively necessary after they had been functionally destroyed by panophthalmitis.

The patient was a man, aged thirty years, who first had blurring of sight in the right eye and paralysis of the right internus. Exophthalmos came on a few weeks later, and after that enlargement of the right thyroid, and increased heart action. The protrusion of the eye increased until the lids could not be closed over it, and inflammation of the cornea and deeper structures followed. After removal of the globe there remained enormous pro-

trusion of the orbital tissues; a hard brawny tissue still continued to fill the orbit. A few months later the second eye became similarly affected, and was lost in the same way. The general condition of the patient improved and the thyroid swelling diminished under use of thyroid extract.

W. F. AIKEN (Savannah) reports a case of exophthalmic goitre following ether anaesthesia. Marked prominence of the eyeballs was observed about the time that consciousness was abolished, and this remained, with other characteristic symptoms of the disease, when the patient was seen nine months later. High hyperopia with astigmatism was corrected, and although no medical treatment seemed to benefit her perceptibly, she gradually improved until, after six or seven years, she was quite well. A hemorrhage occurring in the fourth ventricle is suggested as the probable cause of the attack.—*Transactions of American Ophthalmological Society*, 1897.

The Mechanism of Accommodation.—The question of the mechanism of the accommodation is again being actively discussed and ingenious experiments have been devised for its solution. There are two theories. First, Helmholtz's well-known view is that the contraction of the ciliary muscle relaxes the zonula, permitting the lens to become more convex by virtue of its own elasticity. The second theory especially maintained by Schön and Tscherning ascribes the same result on the lens to a directly opposite effect of the ciliary muscle on the zonula, holding that it exercises traction upon the zonula which, indeed, serves it for a tendon of attachment. The zonula is thus rendered tense and the equator of the lens drawn backward. Now, inasmuch as the vitreous plays the part of an elastic cushion or fulcrum, the lens being pushed against it becomes curved, just as a stick when bent over the knee. The centre of the anterior surface of the lens becomes more convex than the peripheral portion—i. e., the edge is left or rendered hyperopic relatively to the centre.

That this change is a fact, independent of theory, is admittedly proved by Tscherning's optometric and phakoscopic examinations. But this does not necessarily prove the truth of the tension theory. It is also consistent with the Helmholtz view, especially if it be remembered that the lens is not homogeneous, but that it possesses at its centre a differentiated nucleus—i. e., the hypothesis does not require the anterior surface of the lens to become exactly spherical.

But that relaxation of the zonula actually does take place with accommodation is proved by the "accommodative iridodonesis," by subjective (entoptic) phenomena, and by objective measurements. Moreover, the same has been shown anatomically by microscopic examinations of the contracted ciliary muscles in birds. Entoptic examination of the spectrum of the lens shows several punctate opacities. Hess observed that these opacities were shifted uniformly during accommodation. The cause of this is a falling of the lens in consequence of relaxation of the zonula continuing after the lens has reached its maximum of curvature. In different positions of the head the entoptic appearances always corresponded to such falling of the lens. This is inconsistent with the tension theory.

Again, if two threads are stretched in a horizontal plane, one at the distance of the punctum proximum, the other at one metre, the gravitation of

the lens during accommodation should affect the image of the nearer thread upon the retina more than the farther, on account of parallax; and this is found to be the case. When the accommodation is relaxed the images of the two threads coincide; during accommodation they separate, the amount of separation being a measure of the movement of the lens. Such movement has been found to correspond to one-half millimetre in natural accommodation and one millimetre after instillation of eserine.

Finally, the movement of the lens has been objectively measured by examination of the reflexes and found to agree with the subjective determinations.

By the instillation of atropine and eserine into the eyes of birds it is possible to fix the ciliary muscle in a condition of paralysis or spasm. Microscopic examination of such eyes leaves no doubt that contraction of the muscle results in relaxation of the zonula.—L. HEINE, in *Fortschritte der Medicin*, 1897, No. 23.

Electrolysis for Trachoma.—S. SNELL (Sheffield) has found this method of benefit in chronic cases, although he offers it as an alternative more than as a substitute for other methods. The negative pole is applied to the cheek and the positive to the everted surface of the lid; the latter has a curved, flattened platinum electrode which is passed over the conjunctival surface. The strength of the current used is seldom more than 3 milliampères and should not exceed 5 milliampères. A whitish, frothy trail follows the platinum point. In spite of cocaine the application is painful, but the pain soon ceases. It may be repeated every few days.—*Ophthalmic Review*, 1897, page 202.

Chronic Membranous Conjunctivitis.—H. HARLAN (Baltimore) reports a case in a girl, aged ten years, in whose left eye there was a growth from under the upper lid, fibrous in character and extending over most of the lid, consisting of an organized membrane, thick, yellowish-white, easily detached, but leaving a bleeding surface behind. It had all the macroscopic appearances of diphtheritic membrane as seen in the throat, but no diphtheria bacilli were found.

The history was that the eye had been about the same for six years under the care of a number of physicians. The cornea had sloughed years before. Powdered jequirity dusted over the lid provoked a violent inflammation, with great swelling of the lids, some fever, and three days later sore-throat, with the formation of patches on the tonsil and fauces and the appearance of diphtheria bacilli in this membrane. Under antitoxin she promptly recovered from the acute trouble, but the chronic membrane continued.—*Journal of Eye, Ear, and Throat Diseases*, October, 1897.

L. HOWE (Buffalo) exhibited before the American Ophthalmological Society a similar case in a boy, aged eight years, in whom the membrane had lasted for eighteen months, unaffected by treatment. The sight remained good. A sister of this boy had been similarly affected. Each of them had an acute exacerbation, and at that time the sister's eye was lost. Repeated bacteriological examinations had failed to show diphtheria bacilli, except during the acute trouble, when the throat was affected and the bacilli were

found in the ocular secretion. At the time of the boy's acute attack two children that had been in the same ward developed diphtheria and died.—*Transactions American Ophthalmological Society*, 1897.

[Cases of chronic membranous conjunctivitis have been previously reported, but the striking features of this group are, that in each case one eye remained normal, and the development of the acute diphtheria in the course of the disease, with the absence of diphtheria bacilli at other times.

The cases so far reported are not numerous enough to serve as a basis for conclusions, but it is greatly to be hoped that all similar cases will be carefully studied and reported.—Ed.]

Insertion of an Artificial Globe in Tenon's Capsule.—H. McL. MORTON (Minneapolis) suggests that when the retention of the sclera for the insertion of a glass globe is impossible, the globe should be inserted into the capsule of Tenon. To do this, as each of the tendons of the recti muscles is dissected from the globe, a double-needle catgut suture is inserted in it from within outward, enclosing the central portion of the tendon, and tied on its external surface. After all hemorrhage is stopped a glass sphere is placed in the cavity and the sutures from the opposing recti muscles are tied over it, in such a way that the slipping of any one suture will not allow displacement of the others or release the globe. The catgut sutures are then cut off and the conjunctiva is carefully closed over them. In one case in which this operation was done there was no subsequent pain or elevation of temperature, and a support was obtained for the artificial eye equal to that secured by the Mules operation in favorable cases.—*New York Medical Journal*, October 30, 1897.

Treatment of Trachoma.—KUHN (Konigsberg) differentiates trachoma from follicular conjunctivitis, and sums up the treatment of the former as follows: 1. Palpebral spasm, blepharophimosis, disease of the lachrymal sac or faulty position of the cilia occurring as complications are, if possible, to be relieved prior to other treatment. 2. The treatment is to be determined with reference not only to the stage and special form of the given case, but also with regard to external and individual conditions. 3. Of greatest importance, next to the choice of treatment, is the circumstance whether the patient dwells in an immune or an infected locality, and whether, in the latter case, after recovery he is compelled to return thither. 4. Medical treatment (by copper sulphate) alone is suitable only for light cases in immune or almost immune localities. 5. In cases of greater severity procedures looking to the destruction of the (a) individual granulations (e. g., galvano-cautery) and (b) mechanical and operative measures must be employed. 6. The most effective mechanical methods are expression and rolling. 7. In cases of swelling or infiltration of the tarsus, extensive puncturing of this structure should precede expression and rolling. 8. In pandemically infected regions, relapses or reinfections frequently and quickly follow treatment by expression and rolling. 9. No ill effects are observed after surgical intervention (excision of the fornix, or fornix and portion of the tarsus), provided such is properly carried out in suitable cases. In the severely infected districts of East Prussia surgical procedures have alone

proved adequate to bring about permanent cure. 10. In most cases medical treatment should supplement surgical measures.—*Deutsche med. Wochenschrift*, jahrg. xxiii., No. 38.

Congenital Ankyloblepharon.—BRUNZEL (Prague) describes a case, the second on record, of congenital union of the upper and lower eyelids by means of a fibrous band of the thickness of ordinary twine, situated at the junction of the inner and middle thirds of the commissure; its somewhat widened ends were inserted into the epithelium of the free margins of the lid. The band consisted of stratified epithelium, probably the remains of the epithelial tissue uniting the lids during a part of fetal life.—*Prag med. Wochenschrift*, jahrg. xxii., No. 37.

Ophthalmia Nodosa.—GEO. KNAPP (Vincennes, Ind.) reports three cases of this rather rare disease. The first was in a young farmer, who, while climbing a tree, was struck in the eye by a falling body which he believed to have been a caterpillar. At once there were intense itching, burning, and smarting, followed by great swelling of the lids and conjunctiva and haziness of the cornea. In one week the eye was about normal. But the patient returned after three months, having suffered repeated attacks of acute inflammation. There were now present one reddish-gray nodule on the iris and three dark gray nodules in the episcleral tissue. These nodules were excised and hardened in Müller's fluid, and were found to contain fragments of caterpillar hairs.

In the second case the patient was treated for catarrhal conjunctivitis, but the inflammation continued, and three small nodules developed in the conjunctiva. The removal of these nodules, which contained fragments of hairs, brought about recovery.

The third case was that of a young lady struck in the eye by a caterpillar. There were burning, itching, pain, and photophobia. At the first examination no hairs were discovered, but four days after the injury two caterpillar-hairs were found in the cornea and four in the ocular conjunctiva. These were scraped away, and recovery followed.—*American Journal of Ophthalmology*, August, 1897.

Scopolamine as a Cycloplegic.—T. E. MURRELL (Denver) finds scopolamine hydrobromate is the most positive and prompt cycloplegic we have. It should not be used in a stronger solution than the $\frac{1}{10}$ of 1 per cent. Two instillations are sufficient for the most thorough suspension of the accommodation. It is free, in this strength, from the danger of increased tension, and causes no redness of the conjunctiva nor engorgement of the choroid, and no unpleasant symptoms other than those due to its physiological action on the eye. It is convenient to use, reliable in its results, safe, keeps well, and possesses fewer objectionable characteristics than any other known cycloplegic.—*Archives of Ophthalmology*, 1897, p. 335.

Holocain as a Local Anæsthetic.—H. V. WURDEMANN and N. M. BLACK (Milwaukee) report their experience with this new local anæsthetic in ophthalmic work. It is but feebly soluble in cold water, and the 1 per

cent. solution was employed. Such a solution is bactericidal and does not require sterilizing by heat. The instillation causes slight smarting, which lasts about thirty seconds, by which time anæsthesia is produced and continues for ten minutes and upward.

The advantages of the anæsthetic are its non-toxic action in local use, the stability and bactericidal quality of its solutions, the rapidity and completeness with which it produces anæsthesia, the length of time the anæsthesia lasts, the non-dilatation of the pupil, making it useful to instil before irritating applications, as no unpleasant blurring of vision is noticed afterward.

The only toxic effects that have been observed were in its use hypodermatically, it producing clonic spasms like those of strychnia when injected under the skin of animals.—*Ophthalmic Record*, October, 1897.

F. C. Horz (Chicago) found the instillation of holocain always caused more or less smarting and burning, which, however, lasted but about half a minute; it also produced considerable redness of the conjunctiva (palpebral and ocular), which persisted during the whole period of anæsthesia. Within one and one-half to two minutes complete anæsthesia of the cornea was noted; after six minutes the sensibility of the cornea began to return, but a second instillation prolonged the anæsthesia for another five minutes; and if another drop was instilled the anæsthesia could be continued. It would seem that the anæsthetic effect of holocain can be kept up indefinitely by repeating the instillation every five minutes.

Holocain does not contract the conjunctival bloodvessels, and therefore causes neither bleaching of the eye, nor lessening of the lachrymal secretion, nor drying of the corneal epithelium. It does not dilate the pupil and has no effect upon the accommodation. On account of these qualities one would naturally feel inclined to use this new anæsthetic in preference to cocain in all operations on the eye. But a series of comparative tests of the efficiency of the two remedies seemed to show that the anæsthetizing effect of cocain (2 per cent.) is more thoroughly penetrating than that of holocain (1 per cent.).

It is therefore a very useful local anæsthetic for the removal of foreign bodies from the cornea and for operations upon the conjunctiva; but for deeper operations, and especially for those which involve the opening of the globe (iridectomy and cataract extraction) he regards cocain as the more reliable anæsthetic.—*Journal of American Medical Association*, Nov. 13, 1897.

[Holocain differs from cocain, then, in being more brief in its action and in not dilating the pupil or contracting the bloodvessels. It will probably share with cocain in ophthalmic work, these differences fitting the one to certain uses and unfitting it for others. Thus, for some operations, the power of cocain to prevent hemorrhage is only second in value to its power to prevent pain.—ED.]

Exophthalmos Due to Cyst in Nasal Cavity.—H. STRACHAN (Kingston, Jamaica) reports the case of a boy suffering from left exophthalmos, and the inner wall of the orbit encroaching on the orbital cavity. No symptoms of nasal disturbance had been complained of, but on examination there was found some obstruction to the passage of a forcibly expelled or inhaled air-current, through the left nostril; and a tumor was found, high up at the pos-

terior part of the left nasal cavity, pressing on the inner orbital wall. This, on removal, proved to be a cyst containing about one ounce of mucoid material. After the operation the proptosis gradually subsided, and in ten days or a fortnight the condition of the left eye was normal.—*Universal Med. Jour.*, 1897, page 170.

DERMATOLOGY.

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Toxins in Dermatology.—HALLOPEAU (*Annales de Dermatologie et de Syphiligraphie*, 1897, Nos. 8 and 9), in a paper presented at the Twelfth International Medical Congress, discusses the rôle which toxins play in the production of diseases of the skin. These may be divided into exogenous, endogenous, and those of mixed origin. Exogenous toxins, or *toxexogenes*, as the author prefers to call them, may be of animal or vegetable origin. *Toxexogenes* of animal origin produce erythema, œdema, vesication, suppuration, and sphaecelus; and in certain cases, as in the slate-colored patches in plithiriasis, eruptions of a special character. The polymorphous eruptions of scabies, and particularly the intense pruritus, are probably due to toxins secreted by the acarus. Dermatoses due to the ingestion of animal *toxexogenes* are observed more rarely; as an example of this form of dermatosis, urticaria following the ingestion of certain mollusks may be mentioned, and, perhaps, certain eczematous outbreaks. Among *toxexogenes* injections of serum should be included; the eruptions thus produced may be urticarial, morbilliform, or scarlatiniform. *Toxexogenes* of vegetable origin may act directly upon the skin or, after absorption, through the blood. These produce erythema, urticaria, vesicles, pustules, bullæ, ecchymoses, eschars. They are the result of disturbances in vascular and trophic innervation produced by the action of toxins on the peripheral centres of innervation. Among vegetables which produce toxins pathogenic to the skin special mention should be made of the fungi concerned in the production of ringworm.

Sabouraud attributes to the toxin produced by the bacillus found in seborrhœa of the scalp the production of pelade. Among fungi whose secretions are hurtful are those of actinomycosis and Madura foot.

Among endogenous toxins one may distinguish several categories. Such toxins may be the result of the functions of the cells; they are then normal products which become hurtful through their production in exaggerated quantity, or their alteration under the influence of a hereditary or acquired

predisposition, or by transient or permanent alteration of the fluids of the body. The resorption of products of excretion, either because of their excess or obstacles to their elimination, as well as alterations in their composition, may cause autointoxications which react upon the integument.

Toxins produced by microbic activity may be regarded as of mixed origin, the microbes acting in this respect like living cells of the organism. Dermatoses connected with the action of microbic toxins may remain limited to the immediate neighborhood of the microbic focus; others may extend centrifugally. Streptococci have a particular tendency to slowly propagate themselves, producing by their toxins special phlegmasias. Other microbes, after being at first localized, give rise secondarily to phenomena of infection which may be either local or become general; no pathogenic microbes are then found, the phenomena being due to the resorption of toxins. Lastly, attention is called to the infections which may arise from the toxins of tuberculosis, glanders, and leprosy.

Malignant Papillary Dermatitis.—F. H. WIGGIN and J. A. FORDYCE (*New York Medical Journal*, October 2, 1897) report a typical case (with colored picture) occurring in a woman, aged fifty years. The disease began on the nipple of her breast five years before coming under observation, and seven years after the birth of her last child. It was a "small sore" at first; grew gradually, and discharged at intervals a clear, viscid fluid. There were occasional burning and tingling, but no pain. At the end of the five years of its duration it existed as an inflamed area two by three inches in extent, in the centre of which the nipple was so retracted as to be hardly perceptible. It had a sharply-defined border, and its surface presented a granular surface and a bright-red color, slightly streaked with white. The underlying tissues were infiltrated, but no tumor could be felt in the breast. The breast was excised and the growth examined by Dr. Fordyce (a number of good photomicrographs accompany the article). The morbid changes found in this disease may be briefly described as an inflammation of the papillary layer of the skin, leading to an œdema and vacuolation of the constituent cells of the epidermis, followed by their complete destruction in some places and their abnormal proliferation in others. The change in the epithelium of the lactiferous canals and glandular epithelium, which is also of a proliferative and degenerative nature, is secondary to the change in the surface epithelium. The over-distention of the lactiferous canals by the proliferating epithelium, resulting in a malignant infection of the surrounding connective tissue, is the usual termination of the disease, as in the case reported. The chief point of interest in the case was the length of time the disease had existed prior to malignant infection—nearly five years. As is now well known, the disease is particularly liable to be confounded with chronic eczema until the breast itself becomes involved.

The Treatment of Psoriasis.—NORMAN WALKER (*Quarterly Medical Journal*, July, 1897) states that for the scalp, if there is much inflammation, the local treatment may be begun with weak ammoniated mercury ointment, five grains to the ounce, the strength being increased by degrees. Sulphur and salicylic acid are of great value, more suitable when the irritation

is not so severe. They should be used from ten to thirty grains to the ounce, either together or separately. For the disease involving the general surface, bathing in warm water is well spoken of, followed by (where the patches are few and not inflamed) chrysarobin in liquor guttæ-perchæ or tar in collodion, twenty grains to the ounce. Unna's compound chrysarobin ointment is praised. It consists of chrysarobin, 5 parts; salicylic acid, 2 parts; ichthyol, 3 parts; petrolatum, 90 parts. The four internal remedies recommended as being the most valuable are arsenic, potassium iodide, sodium salicylate, and thyroid gland. Caution is given against employing the last-named. It should be reserved for grave cases, and should be used with caution.

Results in Lupus with Koch's New Tuberculin.—O. LASSAR (*Dermatologische Zeitschrift*, 1897, Bd. iv.) treated five cases of lupus vulgaris which were probably benefited by this mode of treatment. The injections were borne without any local reaction. The writer recommends further trial of the remedy, justified by the results obtained thus far.

Tuberculous Lesions in Erythematous Lupus.—AUDRY (*Annales de Dermatologie et de Syphiligraphie*, 1897, No. 5) reports a second case of erythematous lupus in which lesions presenting the histological features of tubercle were found. The case was one of erythematous lupus of the face, perfectly typical in character, observed in a young woman, twenty-seven years of age. The lesions found were quite characteristic, anatomically, of tubercle, but were few in number, it being necessary to examine a large number of sections to find them. Tubercle bacilli were sought for without success. In spite of the absence of bacilli the reporter believes the case to be new proof of the tuberculous nature of ordinary erythematous lupus.

Trophoneurotic Eruption of the Extremities Resembling Dermatitis Repens.—FRÈCHE (*Annales de Dermatologie et de Syphiligraphie*, 1897, No. 5), at a séance of the Société Française de Dermatologie et de Syphiligraphie, reported a case of disease of the hands recalling the *dermatitis repens* of Crocker. The patient was a man, forty-two years of age, apparently in good health, who for eight months had suffered from an affection which had commenced upon the right thumb as a brownish spot upon the nail, without apparent cause. A few days later the skin about the insertion of the nail became red and swollen, pus formed beneath the nail, loosening it and the surrounding epidermis. The disease spread gradually to the palm, invading the entire thenar eminence. Other nails became diseased at short intervals, first the little finger, then the index, the ring-finger, and lastly the middle finger. Some time after, similar lesions appeared upon the left hand. At time of reporting the case the entire palm of the right hand and the fingers were deprived of epidermis, forming a large excoriated plaque. The skin was deep red, smooth, and sprinkled with flat miliary pustules filled with thick yellow pus, and oozing abundantly. The lesion was sharply defined, being surrounded by a well-marked border of loosened and macerated epidermis some millimetres in width. Upon the dorsal surface of the hand the patches only extended about one and a half centimetres beyond the nail-folds, which were swollen and painful, and of a bright-red color. All the

nails of the right hand had fallen, and flexion of the fingers was difficult and painful.

Lupus Vulgaris Treated by Means of the Roentgen Rays.—SCHIFF (*Archiv für Dermatologie und Syphilis*, Bd. xl., Heft 2 and 3) reported at a session of the Vienna Dermatological Association two cases of lupus vulgaris treated by means of the cathode-ray, with noteworthy result. The first case was a fourteen-year-old girl who had had a lupus of the skin of the left forearm since the age of three. In 1891 she had been treated in Billroth's clinic with Koch's tuberculin, without result. The diseased parts were exposed to the rays daily for two hours at a time. On the tenth day the first reaction appeared; the exposed parts became red and swollen, especially about the lupous infiltrate, an abundant secretion trickling out from beneath the crusts. In the following days the crusts fell off spontaneously, and the diseased parts appeared as shallow, indolent, sharply-limited ulcerated surfaces surrounded by a rosy halo. Under continuance of the treatment the ulcers became clean and granulating, pin-head sized, wart-like structures appearing upon the bottom. At the height of the reaction—upon the nineteenth day—the treatment was interrupted. Upon the following days the above-mentioned wart-like structures fell out, leaving sharp-cut losses of substance as if made with a punch. The lupous nodules scattered about in the cicatrices upon the forearm showed a rosy areola similar to the ulcerating lesions; they became swollen, and nodules became visible where none had been noticed previous to exposure to the rays. Some days later the epidermis of the hand and forearm came off, and the nodules fell out. Cicatrization now began and proceeded in the beginning in a normal manner, but later proceeded much more slowly, so that at the end of two months and a half it was not yet completed. On the flexor side of the forearm, where the rays were prevented from reaching the skin by the bones, the lupous infiltrate remained unchanged. The second case, one of lupus in the region of the larynx, reacted in the same manner as the first.

Seborrhœic Eczema upon a Cicatrix.—AUDRY (*Annales de Dermatologie et de Syphiligraphie*, 1897, No. 5), at a meeting of the Société Française de Dermatologie et de Syphiligraphie, reported a case of so-called seborrhœic eczema occurring in a young man, twenty-three years of age, upon a cicatrix the result of a burn in infancy. The occurrence of this disease upon a surface where the sebaceous and sudoriparous glands had been destroyed for years is held by the author to be strongly corroborative of the opinion, which he had previously maintained, that the affection known as seborrhœic eczema is neither a seborrhœa nor an eczema. As the result of experiments made with this case, he concludes that so-called seborrhœic eczema is auto-inoculable.

Leprosy in Holland and Her Colonies.—T. B. VAN DORT (*Dermatologische Zeitschrift*, 1897, Bd. iv.) states that Holland contains about thirty lepers, all of these cases having contracted the disease in the colonies. In the West Indies, at the leper asylum of Curaçoa, there were nineteen lepers in 1896, while on the islands of St. Eustasius and St. Martin, there were seventeen lepers among 5900 inhabitants.

OBSTETRICS.

UNDER THE CHARGE OF

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Pregnancy Complicated with Chorea.—In the *Practitioner*, December, 1897, DAKIN reports seven cases of pregnancy complicated by chorea. While this disease is not common among pregnant women, it is a grave complication when present, and is itself modified by the fact that pregnancy exists. It is much more fatal in pregnant than in non-pregnant women. This is not the case with epilepsy and with some other neuroses, including migraine, for they are less frequent in pregnancy. Another complication which renders cases of chorea in pregnant women especially grave is the fact that mania is so often present in these patients. This results in profound exhaustion, and greatly lessens the probability of recovering.

The first of Dakin's cases was a young woman of good previous history who had borne one child. Since becoming the second time pregnant she frequently fainted, at times could not speak plainly, was maniacal, and had spasms of the left side of the body. These spasms became general, and the patient was delirious at night. She could not be fed, and the sphincters were relaxed. Her temperature was 105° F., and her mania became violent. Although labor was induced, she died before it could terminate. At the time of death her temperature rose to 110° F. Autopsy showed cloudy swelling of the heart-muscle, vegetations on the mitral valve, and cloudy swelling of the other organs.

Case second was four and a half months pregnant and had chorea when seventeen years old. She was delirious at times, and her movements were almost incessant. Although she responded at first to treatment, she died with high temperature, before the uterus could be emptied.

Case third was six weeks pregnant, and made a tedious recovery after the uterus was emptied under an anæsthetic. Morphine entirely failed to control her movements, while hyoscin was successful. Her temperature was normal throughout, with one slight exception.

The *fourth* patient was six months pregnant when chorea began. She was under treatment until her mind became affected, when she was brought to the hospital. Labor was induced and a living child delivered, which survived. The mother made a tedious recovery.

In the *fifth* patient the chorea began at the sixth month of pregnancy, and the patient recovered when labor was induced. The child did not survive.

Case sixth was in her fifth pregnancy at the second month, and left the hospital against advice, because her illness was not severe. She was not improved by rest in bed and by arsenic.

The *seventh case* was a very mild one in which chorea appeared in the second month of pregnancy, the patient recovering under arsenic and bromides without the induction of labor.

From these cases the conclusions are drawn that chorea is most frequent in first pregnancies and in young women. It usually appears during the first six months, the worst cases occurring at the second, third, and fifth months. A mitral murmur was present in all cases. When labor is induced the choreic movements commonly cease. Treatment by drugs is useless, unless the case is a very mild one. After delivery hyoscin used hypodermatically is more efficient than morphine. All fatal cases had high fever. The prognosis in any case seems to depend on its severity within the first week or two of the spasms. Mania is a very dangerous symptom, and the induction of labor or abortion must be undertaken at once when the patient's mind begins to wander. If the spasms are severe enough to keep the patient awake at night, labor must always be induced. This should be done under an anæsthetic.

In severe cases the temperature may rise very suddenly, and hence it should be taken every hour, that efficient treatment may be begun so soon as high fever occurs. If the temperature rises above 100° F., measures should be taken to reduce it.

Transverse Incision of the Fundus in Cæsarean Section.—In the *Wiener klinische Wochen.*, 1897, No. 49, KNAUER reports, from Chrobak's clinic in Vienna, two cases of Cæsarean section in which transverse incision of the fundus was practised. Fritsch has claimed for this method the following advantages: First, the incision is made higher in the abdomen than by the other methods, so that the scar comes in the umbilical region, making the liability to hernia much less. Second, during the operation the abdominal walls are easily kept in apposition, the uterus is readily compressed, and blood does not easily enter the abdominal cavity. Third, the bleeding is very slight, and the stitches readily close the vessels. Fourth, the legs of the child present so soon as the uterus is opened, and the child is quickly extracted. Fifth, the wound rapidly grows less in size so soon as the uterus is opened. Sixth, the uterine wound, after the operation, is contained in the pelvis in its greatest extent.

The case described by the writer was that of a woman, aged twenty-six years and near the end of the first pregnancy. She had already had severe pains. On examination she was found to have a rhachitic, highly contracted pelvis, whose true conjugate was 8 cm. Cæsarean section was performed and the uterus opened by a transverse incision across the fundus. The breech of the child immediately presented, and the fœtus was quickly extracted. It immediately cried and the cord was tied. The placenta and membranes were readily removed. The uterus at the fundus was but a finger's-breadth in thickness. There was but little bleeding, which ceased entirely when the sutures were applied. The uterus was closed with seven deep-buried sutures and a row of fine silk sutures closing the serous surfaces. At first the womb contracted poorly, and two injections of ergotine were given and the uterus was rubbed on its anterior and posterior wall. No compression was made upon the broad ligaments. The uterus finally con-

tracted well and was replaced in the abdomen, and the abdominal wall closed in the usual manner. Mother and child made an excellent recovery.

Especially remarkable in this case was the rapid contraction of the wound after the uterus was emptied. The seven stitches which closed it were placed very close together throughout its extent. After the uterus was emptied the incision was about 8 cm. in length.

In addition to this case a second is reported in which Caesarean section was performed upon a woman who had cancer of the uterus too extensive to permit removal. The uterus was opened by the transverse incision, and the child quickly extracted. The amniotic liquid had been drained away for some time, and when the uterus was opened an arm presented in the wound. The same lack of hemorrhage was observed, and the extraction of the child was most successful.

The case was terminated by amputation of the uterus.

The Origin of General Dropsy in the Newborn.—AUDEBERT (*Revue Mensuelle des Maladies de l'Enfance*, December, 1897) reviews the literature upon this subject and finds that the cases reported have been associated with polyhydramnios, and less often with syphilis. Albuminuria was present in a small proportion of the mothers.

The writer's case was that of a child born in the mother's first pregnancy in spontaneous labor. The size of the fœtus seemed during labor to be excessive, when the mother had strong pains, and succeeded in expelling the child. It survived but a few minutes, although the cord was beating at its birth. An examination of the child showed a large quantity of yellowish serum in the abdomen. The peritoneum was pale, the liver, spleen, and kidneys normal, and the mesenteric glands were not enlarged. There was also fluid in the pleural and pericardial sacs. The placenta was larger than normal and seemed made of very large cotyledons. The placenta resembled somewhat a syphilitic placenta. On inquiring concerning the family history, it was found that the father of the child had once had syphilis. An idea of the weight of the placenta may be obtained by referring to the fact that ordinarily the weight of the placenta is about one-sixth that of the child. The syphilitic placenta, however, is often one-fourth that of the infant.

[In a case of extreme polyhydramnios we had occasion to observe an infant in whom general dropsy was exceedingly well marked. All the serous cavities of the body contained fluid, while the cellular tissue was also dropsical. In this case the child could not be made to breathe, although its heart-beat persisted for some time after birth. The heart-action was especially slow and labored.—ED.]

The Treatment of Pregnancy and Labor Complicated by Cancer of the Cervix Uteri.—In the *Münchener medicinische Wochenschrift*, 1897, No. 47, FEHLING contributes a paper upon this subject. Regarding the frequency of cancer during pregnancy, Fehling has observed five cases in 3000 births. It is much less common than myoma in pregnancy.

As regards treatment, he advises extirpation through the vagina in the

early months of pregnancy. In the later months he would perform Cæsarean operation, remove the child, amputate the uterus, and remove the cervix through the vagina. The total extirpations of the uterus following abdominal incision have not in his experience been successful.

When the cancer is so far advanced that it cannot be removed, Cæsarean section should be performed in the interest of the child only. He reports the following cases:

The first was that of a patient in the early months of pregnancy, in whom the uterus was extirpated through the vagina. A speedy recovery followed.

The second was that of a patient at term in whom cancer of the cervix had proceeded extensively. The child was delivered by abdominal section, followed by a Porro amputation of the uterus. The mother died of cancer about a year afterward.

His third case was six months pregnant, the cervix being infiltrated with malignant growth. A Porro operation was performed, the child perishing. After the amputation of the uterus the cervix was brought out through the vagina and removed, and the peritoneum closed over the vaginal opening. The patient made a good recovery.

His fourth case was that of a multipara with cancer of the cervix, upon whom a Porro operation was performed. The child died soon after birth. The patient's recovery was complicated by an abdominal fistula.

His fifth case was a multipara with cancer of the cervix, who had recently borne a child. The empty uterus was removed through the vagina. The patient became infected, and was ill for three weeks with pleuro-pneumonia, from which she finally recovered.

In the *Centralblatt für Gynäkologie*, 1897, No. 47, RECKMANN reports the case of a multipara who had been greatly weakened by repeated hemorrhages from the uterus. She was six months advanced, and on examination was found to have cancer of the cervix.

The first step in the operation consisted of a thorough curetting and cauterizing of the cervix. The broad ligaments were then ligated with catgut. The uterus was drawn down and the cervix incised so as to split the uterus. The fœtus and its appendages were then removed. The uterus was then retroverted and removed in the usual manner. The patient made a good recovery.

Rupture of the Uterus During Pregnancy.—JELLINGHAUS (*Archiv für Gynäkologie*, 1897, Band liv., Heft 1) reports an interesting case of a woman who had been pregnant eight times, and in each labor had suffered from bleeding from adherent placenta, which required manual removal. She was in the sixth month of her pregnancy and came to the clinic because she had bleeding and pain. She gave a history of having worked hard and sustained a fall from a window. Her miscarriage proceeded slowly, and she was given a laxative to move the bowels. She had six thin movements, and when next examined it was noticed that the uterus was tense and the abdomen slightly distended. There was dulness in the lower portion of the abdomen. This dulness gradually increased; the abdomen was painful and greatly distended. Abdominal section was performed, when it was found that the

nterus had ruptured; the child was at once removed. A Porro amputation of the uterus completed the operation. The patient made a tedious recovery.

The walls of the nterus in this case were excessively thin, and the womb had undoubtedly been weakened by repeated pregnancies and the manual removal of the placenta.

The Bacterium Coli Commune Complicating Labor.—GEBHARD (*Zeitschrift für Geburtshilfe und Gynäkologie*, 1897, Band xxxvii., Heft 1) reports two cases dying of puerperal sepsis in whom this germ had occasioned the formation of a large amount of gas in the blood. It was also found extensively present in many of the viscera. Cultures from these organs proved fatal when injected into animals.

Pregnancy and Labor After Abdominal Myomectomy.—WOYER (*Monatschrift für Geburtshilfe und Gynäkologie*, 1897, Band vi., Heft 6) reports the case of a patient, aged thirty-four years, who had been operated upon by abdominal section for the enucleation of a subserous fibroid. She made a good recovery from the operation. There remained, however, an abdominal fistula through which passed a few drops of blood at menstruation. The patient shortly after had an abortion, followed by more bleeding through the fistula.

The patient entered the hospital at the end of pregnancy, the fistula still open and occasionally discharging bloody serum. When labor commenced this discharge was greatly increased and seemed to be made greater by the movements of the fetus. Meconium was also discharged through the fistula during labor. As birth proceeded the fistula became large enough to admit the finger, which could be passed into the uterus, touching and mapping out the child. The membranes protruded through the fistula. Bleeding and the expulsion of meconium again occurred toward the close of labor, when the child's heart-sounds were irregular. Labor finally terminated spontaneously, the child being stillborn. There was no subsequent bleeding through the fistula. The patient recovered well from labor, and the fistula finally closed spontaneously.

Symphiseotomy in the Country.—In the *Pennsylvania Medical Journal*, 1898, vol. i., No. 8, ARMSTRONG reports the case of a dwarf who had a contracted pelvis. She was in a dirty dwelling in charge of a midwife, who had attempted to deliver her and had pulled out one leg of the child. The patient and her clothing were exceedingly dirty. She was scrubbed as well as possible, and, under chloroform, incision was made directly down on the symphysis, a catheter introduced, the urethra depressed, and the finger passed behind the joint. The pubes was opened with a heavy shoe-knife. The bladder and urethra protruded between the bones after the joint was opened. The child was removed, the uterus emptied and irrigated, the bladder was depressed, and the pelvis brought together. The ligaments and muscles were sewed together with catgut and the skin with interrupted silk sutures. A broad adhesive strip was passed around the trochanters. The patient made a good recovery. Two months after the operation her gait was unsteady, but she had no pain and could move about freely.

GYNECOLOGY.

UNDER THE CHARGE OF
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Perineorrhaphy; a New Flap-Operation.—GUBAROFF (*Centralblatt für Gynäkologie*, 1898, No. 48) describes the following modification of Hegar's operation: A crescentic incision is made at the edge of the vulva joining the posterior ends of the labia minora, and a flap of mucous membrane is dissected upward with the finger and blunt scissors; this is held with forceps while a continuous catgut suture is passed through the skin at the upper edge of the wound and along the edge of the flap, emerging through the skin on the opposite side. Sutures of silk-worm-gut are then passed beneath the raw surface, so as to include the fascia and levator ani muscle. After tying these the continuous suture is tied, puckering up the flap of mucous membrane. The advantages claimed for the operation are: 1. Simplicity and saving of time; the operation is easily performed under cocaine anæsthesia. 2. There are no sutures within the vagina. 3. No tissue is removed. 4. The pelvic floor is actually restored to its normal condition.

Foreign Bodies within the Uterus.—MITTERMAIER (*Ibid.*) adds reports of two additional cases to the list of twenty-four published by Albertin.

Case I.—The patient stated that she was delivered two years before, and a year after underwent an operation for the removal of a fibroid polypus. A foul discharge persisted, accompanied by chills, fever, and profuse menstruation. Suppuration of the adnexa followed, for which hysterectomy was successfully performed. On examination of the uterus a pedunculated sloughing fibroid the size of a walnut was found at the fundus, the pedicle of which was tied with a silk ligature, that had remained in situ for a year and had been the cause of the serious complications following the former operation.

Case II.—The patient, aged thirty years, was curetted for menorrhagia. In irrigating the uterus a glass catheter broke and the end remained within the uterus, whence it could not be removed. On entering the hospital she had fever, the cervix was contracted, and there was marked tenderness in Douglas's pouch. After dilating the cervix it was impossible to reach the foreign body. The bladder was dissected off, the vesico-uterine pouch opened, and the anterior uterine wall was split with scissors up to the fundus. By holding the flaps apart it was possible to see near the right cornu five pieces of glass embedded in the mucosa and muscular wall. These were removed, the wound was closed with tier-sutures of catgut, and the uterus was replaced and sutured to the vaginal wound. Recovery uninterrupted.

It appeared subsequently that two (!) small glass tubes had been introduced into the uterus simultaneously, one of which was connected with the irrigator, while the other was intended to secure the return flow.

OLDAG (*Deutsche med. Wochenschrift*, 1897, No. 23) reports the case of a woman who stated that for two years before she came under his observation she had habitually introduced into the uterus immediately after coitus a long tube, through which water was injected to prevent conception. On the last occasion the tube broke; it was removed by the writer with some difficulty, after dilating the cervix with laminaria tents. The uterine cavity was irrigated and packed with gauze, and the patient made a good recovery. Three months later she aborted, having, as she insisted, not indulged in sexual intercourse since the accident. The inference was that she was pregnant at the time of the operation, and that the pregnancy was not interrupted by the insertion of the tube or the manipulations necessary to remove it.

Iodoform-ether in the Treatment of Cervical Catarrh.—DOLÉRIS (*Bull. Génér. de Thérapéut.*, 1897, No. 11) speaks highly of local applications of iodoform-ether in cases of obstinate cervical endometritis. The iodoform is thought to exercise an antiseptic action, while the ether, by causing strong contraction of the tissues, forces out the contents of the diseased glands.

Emphysema of the Abdominal Wall after Cœliotomy.—LÖNNBERG (*Hygiea; Centralblatt für Gynäkologie*, 1897, No. 49) adds three cases to the nine already reported. In each case the wound was closed with three rows of tier-sutures, in addition to through-and-through sutures; in two drainage was employed. The writer believes that the complication can be avoided by lowering the patient from Trendelenburg's to the horizontal posture and pressing the air out of the peritoneal cavity before tying the last sutures. It is also important that the different layers should be kept in close contact by including contiguous ones in the same sutures.

Hysterectomy for Hæmatometra.—MARGARITO, at the recent International Medical Congress (*La Gynécologie*, October, 1897) advocated abdominal hysterectomy in cases of hæmatometra of long standing, in which the connective and muscular tissue of the uterus becomes so much degenerated that its return to a normal condition is impossible. After evacuating the blood, disturbances in the surrounding organs, adhesions, etc., are apt to occur, which can only be relieved by a radical operation.

Bromine in the Treatment of Endometritis.—NITOR (*Ibid.*) believes that the prophylactic treatment of chronic disease of the uterus and adnexa consists in prompt attention to acute endometritis. To accomplish this it is necessary to resort to some diffusible medicament which can be applied to the entire mucous surface, so as to penetrate between the folds and into the uterine ends of the tubes. He has found in bromine vapor the most satisfactory agent. It is introduced into the uterine cavity through a double-current catheter attached to an atomizer, diffuses rapidly, and exerts a remarkable curative action in cases of acute endometritis and salpingitis.

New Method of Treating Retroflexion.—JONNESCO (*Ibid.*) describes the following method, applicable to cases in which there is no accompanying

disease of the adnexa. The abdomen is opened by a low median incision, the uterus freed from its adhesions and brought forward. A wedge-shaped piece of tissue is excised from the anterior uterine wall at a point opposite to the angle of flexion, and the wound is closed with deep catgut sutures.

The round ligaments are then shortened according to Wylie's method. The writer reports four successful operations.

Secondary Cœliotomy.—NOLTSCHINI (*Ibid.*) concludes a paper on this subject, based on 3160 cases, as follows: 1. Secondary cœliotomy is usually performed for ileus, hemorrhage, obstruction of the ureters, or general peritonitis. 2. The true cause of the formation of adhesions has not been satisfactorily explained, and this complication is none the less frequent since aseptic has been substituted for antiseptic technique. 3. The indications to re-open the abdomen in cases of peritonitis are not clearly defined. 4. Cœliotomy is indicated in ileus, though the mortality is high (38.5 per cent.). 5. The time which intervenes between the first appearance of symptoms of obstruction and surgical interference should have no direct influence. 6. Emaciation, collapse, and intestinal paralysis may serve as contra-indications. 7. While peritonitis, hemorrhage from the slipping of ligatures, and obstruction of the ureters have become rare, through the improvements in technique, there still remain a considerable number of cases of ileus. 8. The prophylaxis of intestinal obstruction depends upon two points—the avoidance of free purgation before operation, which tends to weaken the muscular coat of the gut and cause paralysis, and the elimination of mechanical and chemical irritation of the peritoneum during operation.

Application of Pressure in Treatment of Pelvic Disease.—FEHLING (*Centralblatt für Gynäkologie*, 1897, No. 40) affirms that he is becoming more and more inclined to try the effects of local treatment in cases of chronic inflammation of the adnexa before resorting to surgical measures. His rule is not to operate in the acute stage of infective troubles, to operate if suppuration is established, and in the "intermediate stage" of infiltration or exudation to promote absorption. For the latter purpose he has used the ordinary therapeutic agents—hot douches, iodine, ichthyol, massage, etc.—but now substitutes for them graduated pressure, prolonged daily for several hours. A bag of thick rubber is introduced into the vagina and distended with water. A large bag, weighing several pounds when full, is then applied to the lower part of the abdomen. As the result of this continuous pressure, the vagina is lengthened and dilated, the uterus and adnexa are elevated, and the abdomen is so flattened that it becomes possible to map out the pelvic contents with great distinctness.

This treatment has a marked beneficial effect upon diseased and adherent ovaries and tubes, adherent retroverted uteri, and in cases of cicatricial contraction and non-development of the vagina.

Statistics of Carcinoma Uteri—THORN (*Ibid.*) calls attention to the contrast between the present low mortality of vaginal hysterectomy for carcinoma uteri (1 to 5 per cent.) and the high percentage of recurrences. Hardly 30 per cent. of the patients have been well at the end of five years. This

unfavorable result he attributes, not to the operation, but to the fact that 70 per cent. of patients are found to be inoperable when they are first examined, while in a considerable proportion of those who are operated upon the disease has already extended beyond the uterus. The latter cases should be carefully separated from those in which the conditions are favorable for a successful extirpation, since in nearly all cases recurrence takes place within two years in the cicatrix. Recurrence due to infection during the operation occurs in only 10 per cent., hence the claim of Maekenradt for his method of "igni-extirpation" is not based on facts. The writer regards it as a step backward.

Of sixty-two cases in his practice (mortality, 1.6 per cent.) twenty-seven patients had a recurrence within two years, all being "unclean," *i. e.*, the disease was not confined to the uterus at the time of the operation. Of thirty-two favorable cases, only two had a recurrence within two years. Seventeen patients had been operated upon six or more years before; 23.5 per cent. were free from recurrence.

The writer believes that Freund's operation is indicated in certain cases, but he rejects the saeral method on account of the high mortality.

Improvement in statistics will not be accomplished, he says, by devising new surgical methods, but by early diagnosis and early resort to a radical operation. Without the intelligent co-operation of the family physician, it is vain to expect any better results than those which have already been obtained.

Metastases in Vesicular Mole.—PICK (*Ibid.*) reports the following case: In a young woman, four months pregnant, with hemorrhages, a bluish polypoid tumor the size of a walnut was observed on the anterior vaginal wall. A few days later a vesicular mole was removed from the uterus, the patient making a good recovery. She was well three and one-half years later. Sections of the vaginal growth showed typical chorionic villi, on the surface of which was syncytium in active proliferation. The capsule of the tumor consisted of coagulated blood, in which were syncytial outgrowths. The writer infers from a study of this case that true metastases may take place in connection with benign vesicular moles. The large syncytial elements present in the sections examined were identical with the cells described by Neumann in malignant moles, which, he affirmed, were never found except in such growths, and constitute a strong indication for extirpation of the uterus.

Sterilization by Section of the Tubes.—BRUTTNER (*Ibid.*) suggests the following method: The abdomen is opened by a transverse incision just above the symphysis. The Fallopian tubes are divided as far as possible from the uterus, and the four ends are closed with separate sutures, including the muscle and peritoneum. The divided ends are reunited by circular serous sutures (as in circular enterorrhaphy), so that a double septum is formed while the tube retains its normal position.

FRITSCH (*Ibid.*) thinks that in some cases it may be desirable to prevent future conception after performing vagina-fixation in the case of a woman who already has children, considering the risks of pregnancy. Kehler's

method then offers advantages. The writer reports a case in which he first resected portions of both tubes and then performed vagino-fixation. Ligation is not sufficient, as he once tied both tubes with silk, yet the patient had a child three years later.

The Ovaries in Fibro-myoma of the Uterus.—VAN MEERDERVOORT (*Ibid.*) examined forty-five specimens, reaching the following conclusions: The circulatory changes produced by myomata cause hyaline degeneration of the vessel-walls in the ovary. The stroma usually undergoes a similar degeneration. The number of primordial follicles diminishes, and some degenerate. Follicular and corpus luteum cysts develop. Corpora albicantia are very common, originating from hyaline degeneration of the thickened vessels. Pigmented cells are numerous.

The writer was unable to demonstrate the presence of inflammatory processes. He finds that the usual enlargement of the ovary is due to the formation of corpora albicantia, as well as to the enlargement of follicles and cystic development.

Ovarian Tumors Complicated with Pleurisy.—RESINELLI (*Annali di Ostet. e Ginecologia*, 1897, No. 18) concludes an elaborate paper on this subject as follows: Pleuritic effusions in connection with ovarian tumors are to be regarded not as an independent complication, but as a direct result of the presence of the neoplasm. The effusion develops gradually and is unaccompanied by pain or fever. The accumulation of fluid is not due to the presence of the tumor or to changes in the blood, but is really an evidence of metastasis to the pleura, less frequently of peritoneal irritation transmitted through the diaphragm. It is accordingly strong evidence of the malignant character of the tumor, provided that torsion, suppuration of the cyst, etc., can be excluded.

A pleuritic effusion, instead of furnishing a contra-indication to operative interference, may show the necessity of an early operation, provided that the peritoneum is not too extensively involved. In rare cases thoracentesis may be required before celiotomy is performed, though removal of the tumor is the most direct way of causing the disappearance of the pleuritic fluid.

Action of Extract of Menstrual Blood and of Ovarine on the Blood-Pressure.—FEDEROFF (*Wratsh*, No. 26, 1897; *La Gynécologie*, October 15, 1897) injected extracts of menstrual blood, of the mammary glands, and of the ovaries into the blood of rabbits, with the view of noting their influence upon the blood-pressure. His conclusions are as follows: 1. An aqueous solution of the glycerin extract of menstrual blood lowers the pressure in the carotid, increases the heart-action, and accelerates the respirations; the same effect is produced by a similar extract of blood obtained just before menstruation, by an extract made from the endometrium during ectopic gestation, and by an extract of the mammary gland. 2. Ovarine and fresh ovarian extract also raise the pressure, but diminish the heart-action and slow the respiration. 3. In the human female the pressure in the radial is notably increased after the administration of ovarine. 4. Poehl's ovarine

has a marked beneficial effect in the disturbances attending the climacteric, as well as in functional derangements of the ovaries.

Subcutaneous Injections of Saline Solution in Septicæmia.—MANGIN and RAYNAUD (*Ibid.*) report several cases of septic disease of the adnexa in which subcutaneous injections of saline solution were administered before and soon after operation, in quantities varying from 200 to 500 grammes. Their conclusions are thus stated: Injections of artificial serum possess great value in cases of general septic infection, especially at the onset of the disease. The circulation is regulated, the heart-action increased, and the cerebro-spinal system and nutritive functions are stimulated. Diuresis is increased within a few hours, but no appreciable amount of toxic matter is eliminated. The improvement in the general condition is to be ascribed to dilution of the toxins in the blood, which are thus rendered less noxious to the cells. This process of dilution should be continued as long as fresh toxins develop, by the gradual injection of moderate quantities of saline solution.

Artificial serum exercises a most favorable action upon anæmic and asthenic patients, who are exhausted by a long illness or severe operation, and also prevents shock if injected *before* such an operation. The ease and safety of the subcutaneous method and the fact that it may be practised by the unexperienced commend its general use.

Intravenous injections should be reserved for cases in which a very rapid action is necessary, as in profuse hemorrhage, or in desperate cases where subcutaneous absorption is poor because of the depressed condition of the patient.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

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Bacteriology of Milk.—In the early days of bacteriology Sir W. Roberts showed that milk, blood, and urine were in the living body absolutely free from bacteria, and, if drawn through sterilized tubes into sterilized flasks plugged with sterilized cotton wool, would remain unchanged for months or years, without even having been themselves boiled, since it was quite superfluous to sterilize a sterile fluid; not only putrefaction, but the so-called "spontaneous" coagulation of milk, as well as its souring, being brought about by the access of bacteria from without. With the different actions of the *B. coli communis*, *B. typhosus*, etc., we are now well acquainted: and attention has recently been called to the myriads of non-pathogenic bacteria

present in milk and cream as sold. But few serious attempts have been made to differentiate between and to determine the functions of what may be called the normal bacteria of milk, that is to say, those which, under the best possible precautions against extraneous contamination, are invariably present in it by the time it reaches the market. C. Guenther and H. Thierfelder, however, in the *Arch. f. Hygiene*, xxv., come to the conclusion that the "spontaneous" coagulation and lactic fermentation are the work of one particular species which, absent from fresh drawn, is always abundant in curdled milk. It is described by them as 1μ in length and a half μ in thickness, stationary, not bearing spores, stained by Gram's method, growing best in a solution containing both sugar and albumin, at a temperature of 28°C ., and with or without access of air; it does not liquefy gelatin or evolve gases, grows badly on potato, and forms on the surface of agar a film like fine dew. A. Luebert, *Zeitsch. f. Hyg.*, describes a spontaneous peptonization which milk occasionally undergoes, rendering it highly deleterious to infants, though drunk with impunity by adults. The agent in this change is the *bac. i.* of Flügge, a short, thick, very mobile organism, having no action on sugar or fat, but liquefying serum gelatin and peptonizing albumins to the extent of 93 per cent. in twenty-four hours. The poison is not in the caseoses or peptones formed, but in the bodies of the bacilli themselves. Abstracts of both papers may be seen in the *Hyg. Rundschau*, vi., pages 506 and 851, respectively.

Milk Preservatives.—Salicylic acid, carbonate of soda, and borax are the chief ingredients of the preservatives so much used by the small retail dealers who do not, like the larger firms, put their surplus milk at the close of each day through a separator, converting it into butter, but carry it over to the next to be mixed with the fresh milk or to be sold to their less fastidious and poorer customers. Salicylic acid or salicylate of soda is easily detected by the color it gives with ferric chloride, but for soda and borax, P. Solomon, *Hyg. Rundschau*, vi., 506, recommends the method of Tscherbakoff as the best preliminary test. It consists in the addition of 10 c.cms. of the milk to the same volume of alcohol of the strength of 95 per cent., when it will coagulate in large clots unless soda or borax be present. Even as little as 0.06 per cent. of soda, though it does not prevent, delays coagulation for five minutes, and the clots which then fall are small and quite unlike those produced by the alcohol in pure milk. Of course, a positive result should be verified by more exact analysis before legal proceedings are taken. Formalin, however, is fast coming to the front, and for it other tests must be found.

Toxicity of Sweat—Ochlosis.—ARLOING belongs to the "old school," who, despite the *negative* results obtained by analysis, adhere to the beliefs that excess of CO_2 and deficiency of O_2 in the expired air are not sufficient to explain the phenomena of *ochlotie* poisoning, differing as they do from those following descent into wells, vaults, or rats in which CO_2 has accumulated, and from those of "mountain sickness" and of balloon ascents, where O_2 alone is deficient, and that the presence in the breath and probably still more in the exhalations from the body of some organic poison, perhaps

capable of baffling the resources of chemists for many years to come, must be assumed to account for the symptoms and phenomena in question, and has shown that the sweat, at any rate, possesses a high degree of toxicity.

Having steeped in distilled water the vest of a man who had been dancing throughout a long evening, he injected the liquid into several dogs. They became drowsy, were taken with violent diarrhœa, and died in a few hours. The autopsies showed congestion of the entire alimentary canal, yellow patches on the liver surface, whitish clots occupying the cavity of the heart, and the auriculo-ventricular valves patent. The symptoms induced in rabbits by the sweat from the same person's drawers, or lower limbs, were different—viz., excitement, crethism, clonic spasms, followed by paralytic phenomena and death. There is no question here of O_2 and CO_2 , nor are the symptoms, especially as exhibited in the rabbits, those of common septicæmia or sapræmia, nor, again, would such small doses of kreatin appear adequate; and one is driven to the conclusion that toxic products of the waste of the tissues are eliminated by the skin and possibly by the lungs also; at any rate the former source cannot be denied, and until the chemists have demonstrated the cutaneous it ill becomes them to deny the pulmonary poison.

[Personally, however, I am quite prepared to renounce the latter, believing that the former is the chief factor in oedhotic poisoning, the milder forms of which are felt inversely as the cleanliness of the crowd, being more painfully felt by the susceptible person, like myself, after some hours passed in a law court, especially the police and county courts, a primary school, or a theatre, than in a church, concert, or private reception-room, however crowded. Where there is a stench there must be something more than an excess of inodorous CO_2 , and, however interesting to the physiologist, it matters not to the practical sanitarian (save as an argument in favor of public baths) whether the immediate cause of oedhotism be exhaled from the pulmonary or the cutaneous surfaces, not to mention the buccal cavity and interstices between the teeth. Indeed, I believe that "o'elo's" play an important part in the production of "oedholosis."—E. F. W.]

But these crude observations of M. Arloing promise, if verified, to open up wide fields for pathological research. His dancer was presumably in the enjoyment of good health; but we must have biological and chemical examinations of the sweat in rheumatic fever, in acute gout, nephritis, etc., following chills, in scarlatina, etc., and in habitual malassimilation of food, habitual urinary deposits, etc. What light might not be thrown on the consequences of chills in apparently inducing, and certainly in aggravating and complicating, a large number of febrile pathological states, as well as on the relation between eruptions and defective or excessive cutaneous secretions, and the elimination of drugs or the poisons of disease.

"Natural" Treatment of Sewage.—An interesting experiment is being carried out at Exeter, a city of 40,000 inhabitants. The engineer, Mr. Donald Cameron, being called on to purify the sewage before discharging it into the river, refused to use any chemicals which would have the effect of destroying along with the bacteria of putrefaction those in whose function of resolving all organic matter into its ultimate components, CO_2 , NH_3 , and H_2O , rests the entire process of self-purification of water, as well as of the treatment of sewage by irrigation, and the theory of manures.

He determined to trust wholly to the unchecked action of these organisms by storing the crude sewage in huge covered tanks until the reduction of the organic matter was complete, and thus far the results have been satisfactory. No sludge is formed, and after six months there is only a thin deposit of sand and earthy matter; but a thick scum forms on the surface of the tank, the constituents of which are constantly sinking and rising, though within a range of a few inches only. The effluent is comparatively clear and inoffensive, not fit to turn into a river, but eminently suited for irrigation, since it contains the whole of the nitrogen in the form of non-volatile ammonium salts, while free from the glutinous, crude matters which tend to clog the soil.

The bacteria in the dark, closed tanks are anaërobic, resolving albumin into ammonia, while the nitrifying bacteria of the earth are aerobic and oxidize the ammonia into nitric acid. The effluent intermittently filtered through loose coke breeze is rendered nearly colorless and quite free from smell—in fact, fit to be discharged into any river.

Alcoholic Fermentation Produced by Fluids of Living Cells.—PROF. BUCHNER has succeeded in obtaining a clear yellow fluid by crushing yeast and compressing the cells with a pressure of from 400 to 500 atmospheres. After every vestige of the living cell has been removed by filtration, the fluid displays the important property of producing alcoholic fermentation, thus refuting the hitherto accepted idea that fermentation is associated only with the presence of the living cell.

Disinfection of Sewers.—DR. C. R. C. TICHBORNE (*Dublin Journal of Medical Science*, July, 1897) shows by experiment that if by means of a pipette we pass a layer of carbolic acid into a shallow dish of water, and after it has stood some little time, draw off some of the supernatant water and test it with bromine, it will be found to contain no carbolic acid. Using a mixture of crude carbolic acid and the light oil of tar ("light coal-tar oil"), which is especially rich in the benzene, naphthalene, and terebene series, the mixture having a specific gravity of 0.850 to 0.950, we find on introducing it into the water with the pipette that it immediately rises to the surface, and if some of the water be removed at once from the interior and tested with bromine, it will show the presence of carbolic acid and naphthalene. Hence, instead of adding a heavy disinfectant which sinks to the bottom, we should use one which disinfects from the surface downward.

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EPIDEMIC CEREBRO-SPINAL MENINGITIS.

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CEREBRO-SPINAL MENINGITIS was first recognized as a definite disease by Vieussieu, in Geneva, in 1805. It is very probable that some of the epidemics in preceding centuries were cerebro-spinal meningitis; but, in the absence of definite clinical reports and the records of post-mortem examinations, it is impossible to be certain of this. The history of these early epidemics and the supposed identity of some of them with cerebro-spinal meningitis has been admirably treated in a paper by Dr. S. G. Webber. After Geneva, the next appearance of the disease was in Medfield, Massachusetts, in 1806, and it was described by Danielson and Mann in the *New England Medical and Agricultural Register*. In the same volume of this magazine there is a letter to the editor from Vincennes, Indiana, describing a virulent epidemic disease there which principally attacked young people, and the editor very pertinently asks if this might not be the same disease as that described by Danielson and Mann.

Apparently beginning in Medfield, Mass., the disease extended as an epidemic over the New England States and into Canada, Pennsylvania, and Maryland, and prevailed until 1816. There are two interesting descriptions of the disease in this period. Elisha North, Goshen, Conn., in 1811 published a small book on spotted fever, in which he not only

gave his own experience with the disease, but collected a number of descriptions, many of which had appeared in the newspapers. The other important article relating to this period is the report of a committee appointed by the Massachusetts Medical Society in 1809 to investigate the disease. The committee was composed of James Jackson, Thomas Welch, and J. C. Warren, and in the report there is an account of eight post-mortem examinations, most of which were made by Warren. Danielson and Mann had previously reported the results of four post-mortem examinations.

Hirsch, in his admirable description of the disease, divides it into four periods. The first from 1805 to 1830, in which the disease principally prevailed in the United States; the second from 1837 to 1850, in which it principally prevailed in France, and extended from France into Algiers; third, from 1855 to 1875, when it prevailed chiefly in Germany; and the fourth from 1875 to the present time, in which the disease appears to have been generally diffused, and has appeared in small epidemics in a great number of places.

From 1820, which marks the end of the first period of the epidemic prevalence in the United States, there was but little seen of the disease until 1849, when it prevailed in some troops stationed at New Orleans, and in small epidemics in various places in the South. More or less of it was seen in both armies during the civil war, and a good description is given by Upham, who observed an epidemic in the troops stationed at Newbern, N. C. At the same period the disease prevailed extensively at Philadelphia and in Boston. Since that time there has been a considerable epidemic in Boston in 1874; in Lanaconing, Md., in 1892, and in New York in 1893.

Considered as an epidemic, cerebro-spinal meningitis has many features which distinguish it from epidemics of other infectious diseases. As a rule, none of the epidemics have shown a continuous extension, this being noticeably the case with the first recognized epidemics. In the French epidemics from 1840 to 1845 it appeared in some cases to extend with the movement of troops, and was undoubtedly carried into Algiers in this period by the French troops. As a rule, the outbreaks of the disease have been seen as perfectly isolated epidemics in places which had been hitherto free from it. Almost all of the epidemics have appeared in the winter and spring. Woodward speaks of the disease in Litchfield County as appearing in the spring when the frost was being dissolved and the ground breaking up, and says the disease seemed to be more common in rainy weather. There are few exceptions to this rule. In a few places the disease appeared in the summer.

During the past winter and spring a small epidemic of the disease has prevailed in Boston. We have collected all of the cases which were seen in the Boston City Hospital, the Massachusetts General Hospital,

and the Children's Hospital from June, 1896, to October, 1897, and have found 111 cases. In 1896, 1 case appeared in June; 1 case in September; 3 cases in December; in 1897, 1 case in January; 10 in February; 23 in March; 29 in April; 21 in May; 14 in June; 7 in July; and 3 in September.

In general, the disease has been most prevalent in children and young adults.

Lichtenstern, in the epidemic in Cologne in 1885, found that only 23 of the 111 cases occurred after the thirtieth year. The ages given by Lichtenstern for his 111 cases are almost exactly the same as we have found in the same number of cases.

Some writers do not believe that the disease is contagious, and in going over the accounts of the epidemics we have found very little evidence for contagion; as a rule, but single cases have appeared in the same family and in the same house. A map of the city, giving the distribution of the single cases, shows them to be pretty well scattered over the city, there being only two localities where the cases were especially numerous.

In a question of the probability of the transmission of an infectious disease we must consider the location of the disease in the body, and the ways in which the organisms causing it can pass from the lesions of the disease to the outside; further, the viability of the organisms and the possibility of their leading a saprophytic existence.

The lesions of meningitis are chiefly in the meninges in the brain and cord, and in most cases confined there. In a certain number of cases there are lesions in the lungs, ears, and nose in which large numbers of organisms are present, and from which infection to neighboring objects or persons could easily take place. The organism, as far as we have been able to tell from its behavior on culture-media and in the tissues, has a feeble vitality, and would not be capable of leading a saprophytic existence. It must be remembered, however, that we cannot reproduce the conditions which organisms may find in nature. The organism increases in the affected individual, and, in a certain number of cases, may infect his surroundings, and may, in a manner which we do not know, be conveyed to the tissues of a susceptible individual, and there produce the disease. Why this takes place in some cases and not in others, and the conditions under which it takes place, we do not know.

There is but little in the literature bearing on the subject of immunity in this disease. We have been able to find but five cases in which the same individual is reported to have had the disease twice, and in one of these the second attack is to be considered a relapse and not a fresh infection. The mortality of the 111 cases was 68½ per cent.

A great deal of interest attaches to the sporadic cases of cerebro-spinal meningitis. We can only be certain that these sporadic cases

represent the same disease as the epidemic form, when the same organism has been found in cultures. So far we have only been able to find one instance in which the *diplococcus intracellularis*, the organism of epidemic cerebro-spinal meningitis, was found in a sporadic case. In most of these cases no cultures have been made, but, so far as we can judge from the clinical and anatomical descriptions, many of these sporadic cases represent the true epidemic form. Almost all observers who have been acquainted with the epidemic form of the disease speak of the presence of sporadic cases occurring both before and after the epidemics. In the reports of the sporadic cases we think it may be generally assumed that the cases which recovered were of the epidemic form. So far we have not been able to find a case which certainly could be regarded from the accompanying pneumonia or endocarditis as pneumococcus meningitis which has recovered. In the same way there are no recoveries noted from cases of meningitis secondary to thrombosis of the lateral sinuses or disease of the middle ear, in which cases the *streptococcus pyogenes* is usually the infecting agent. This matter of the relation of sporadic cases to the epidemic form is one of great importance, and can only be determined by careful bacteriological examination of the organs of the cases which die, and bacteriological examination of the exudation obtained by spinal puncture in all cases. It seems probable that sporadic cases of epidemic cerebro-spinal meningitis constantly occur, and under conditions the nature of which we are not aware may so increase in number as to form an epidemic.

Nothing can be learned with regard to these cases from examination of mortality tables. One gets the impression from such tables that the disease is very frequently not recognized when it occurs, and that many cases are reported as meningitis which are not so. A large percentage of the cases of meningitis are reported in such tables as occurring in children under one year of age, whereas all forms of meningitis are extremely rare at this age. In our 111 cases there was but one case under one year.

The etiology of cerebro-spinal meningitis until recently has been involved in obscurity. The first description of an organism which might be considered as the *diplococcus intracellularis* was given by Lich-tenstern in 1885. He found in the exudation in the meninges a few cocci, sometimes single, sometimes in groups similar in arrangement to gonococci, enclosed in white corpuscles. Schwabach found diplococci in the pus-cells in a case of otitis media secondary to meningitis.

The first definite description of the organism was given by Weichselbaum in 1887. The organism is described by him as a *diplococcus* which, in the lesions, is found almost solely within the cells. He found that it grew best on agar-agar, the pure cultures forming a white, rather viscid growth; and the single colonies often appearing to be

formed of small confluent masses. In cultures the organisms grow singly, in pairs, and in tetrads; both in cultures and in the tissue they are decolorized by the Gram stain. Weichselbaum inoculated mice, guinea-pigs, rabbits, and dogs with pure cultures of the organism. Subcutaneous inoculations were without result, but inoculations in the pleural or peritoneal cavities proved fatal in guinea-pigs and rabbits in from one to four days. In these serous membranes, inflammation with sero-fibrinous exudation was produced. He produced meningitis and encephalitis in dogs by inoculating them directly in the meninges. He called the organism the *diplococcus intracellularis meningitidis*.

There were few confirmations of the discovery of Weichselbaum until 1895. Jäger found the same organism in twelve cases of epidemic cerebro spinal meningitis occurring in the garrison at Stuttgart. His description of the organism agrees essentially with that of Weichselbaum, with the exception that he says a capsule was sometimes found around the organisms, and that cover-slips made from the cultures could be stained with Gram. Weichselbaum claimed that neither in cultures nor in the tissues would the organism take the Gram stain. Since then the organism has been generally found in the epidemics of the disease which have been investigated, and in one sporadic case.

In thirty-five of our cases on which post-mortem examinations were made, diplococci were found in cultures or on microscopic examination of the exudation or in microscopic sections of the tissues in all but four cases. In most of the cases they were found by all three methods of examination. In one case in which they were not found at the post-mortem examination they had previously been found in the fluid withdrawn by spinal puncture. Two of the other cases were very chronic, and no acute lesions were found. The fourth case was a chronic case with a mixed infection with tuberculosis. The diagnosis of the mixed infection of this case was made from the character of the lesions in the meninges and from the extension of the inflammatory exudation along the nerves without any evidence of tubercular lesions, although old tubercles were found in the meninges. In a certain number of cases cultures failed to give the organism, although they were abundantly present, as shown by cover-slip examination of the exudation in the meninges and microscopic sections. As showing the difficulty in growing the organisms in cultures made from the meninges at the post-mortem examination, ten cultures were made in one case from the exudation on the brain, and six from the cord, cover-slip examination showing abundant organisms in the cells. Only two of the cultures from the brain and one from the cord showed a growth, a single colony being found on each tube. In ten cultures from the brain and nine from the cord, in another case, but two tubes showed a growth. As a rule, the organisms were more easily obtained in cultures made in the acute

cases than in the chronic. In a few of the cases the culture-tubes showed a very abundant growth of the organism, so abundant that on casual inspection of the tube the growth might very well have been taken for the pneumococcus.

When grown in pure culture the diplococcus intracellularis of Weichselbaum has the following characteristics: It is of about the same size as the ordinary pathogenic micrococci, and appears in diplococcus form as two hemispheres separated by an unstained interval. It stains with any of the ordinary stains for bacteria and is decolorized by the Gram method of staining. There is considerable irregularity in staining, some organisms being brightly stained, others more faintly. Sometimes this difference in staining is seen in a single pair of organisms, one being more brightly stained than the other. There may also be considerable variation in size, the larger organisms staining imperfectly. In these swollen organisms there is often a brightly stained point in the centre, while the remainder of the cell is scarcely colored. This condition may have been mistaken by Jäger for a capsule around the organism. These variations in size and in staining appear to be due to degeneration, and are more common in old than in fresh cultures. Division usually takes place in one plane, giving rise to diplococci; tetrads are occasionally seen. There is little or no tendency to grow in the streptococcus form, although short chains of from four to six organisms may be found. We have never seen the streptococcus form described by Jäger, and in the short chains the longitudinal line on which he lays so much stress was not seen. In cultures the organism does not give a profuse growth on any media. We have found the blood-serum mixture of Löffler the best adapted for its growth. From its feeble growth on agar we are sure that had this medium been generally used for the first cultures, the organism in many instances would not have been found. In all cases a large number of organisms appeared to be dead, or at least they did not grow. Even when a large quantity of an exudation, which on microscopic examination contained large numbers of the organisms, was spread over the surface of a culture-tube, only single colonies developed. The same was true in transplanting colonies. In place of a streak, single colonies developed in the line of the needle. To be sure of obtaining growth it was necessary to make a number of cultures, using large amounts of the exudation. To keep pure cultures going, transfers were made daily, and four or five tubes inoculated. On the Löffler serum mixture the diplococcus forms round, whitish, shining, viscid-looking colonies, with smooth, sharply-defined outlines, and may attain a diameter of 1 to 1½ mm. in twenty-four hours. In acute cases, when large numbers of the organisms are present, there was in some cases an abundant growth of minute, round, transparent colonies bearing much resemblance to the pneumococcus lanceolatus. The growth is feeble on

plain agar, better on glycerin agar, though on neither so good as on blood-serum. In bouillon the growth is feeble and the media become only slightly cloudy. At the bottom of the test-tube there is a scanty, whitish sediment which rises up as a viscid string when the tube is shaken.

In the tissues the diplococcus is almost strictly confined to the interior of the polymuclear leucocytes. It was never found in the bodies of other cells. It has no definite position in the cell, and is never found in the nucleus. When smears of an exudation are made, appearances suggestive of this may be found, the result of distortion of the cells in making the preparation. The number of organisms found in the cells varied from a single pair to cells so closely packed with them that the nucleus was obscured. In no case were the diplococci found except in connection with the lesions of the disease. So far as could be learned from cultures of the blood, liver, spleen, and kidneys the organism never produces septicæmia. Mixed infections with other organisms were not uncommon. The pneumococcus was found seven times in connection with the diplococcus intracellularis and once Friedländer's bacillus was found. Terminal infections with staphylococci and streptococci were occasionally found. The results of inoculations are confirmatory of previous experiments. The organism has very feeble pathogenic powers, even when injected into the pleural and peritoneal cavities of rabbits and guinea-pigs. In a small percentage of cases death was produced in from twenty-four to forty-eight hours, and a slight fibrino-purulent exudation was found in the membranes. Typical meningitis was produced in a goat by inoculating directly into the spinal canal. The animal died within twelve hours, and at the post-mortem examination a slight fibrino-purulent exudation was found in the meninges of both the brain and cord.

Lumbar puncture was performed in fifty-five cases, and in a few cases several punctures were made in the same individual. In the fluid obtained the diplococci were found on microscopic examination or in cultures in thirty-eight cases. In seventeen of the cases they were absent. The average duration of time from the onset of disease before spinal puncture was made was seven days in the positive cases, and seventeen days in the negative cases. The longest time after onset in which a positive result was obtained was twenty-nine days. The negative cases were most numerous in the early part of the epidemic before we had realized how difficult it was to obtain cultures of the diplococcus in all cases. In one case in which cultures were made by pouring 1 cc. of the fluid obtained over the slanting surface of the culture media, on one tube one colony developed, three on a second, and none on four others. In another case fifteen tubes were inoculated with the fluid. On two of the tubes there were two, and on one ten colonies of the

organism; twelve tubes remained sterile. In this case microscopic examination of the fluid showed considerable numbers of diplococci in pus-cells.

The character of the fluid obtained by spinal puncture varied greatly. In some cases, even when diplococci were found in it, it was almost clear, showing only a slight turbidity when held against a dark background. In most of the cases where the puncture was made early in the disease the fluid was turbid, in some almost like pus, and in twenty-four hours a large sediment formed at the bottom of the tube. The amount of fibrin which formed in the fluid varied.

Interesting results were obtained in those cases in which several spinal punctures were made in the course of the disease. In these cases there was a diminution in turbidity, often accompanied by the absence of organisms in the fluid last withdrawn. In one chronic case, of a marked intermittent character, three punctures were made, one before, one after, and one during an exacerbation. In the fluid obtained by puncture before and after the exacerbation no diplococci were found. The fluid obtained during the exacerbation was more cloudy and contained diplococci. In the fluid obtained in early punctures two or three days after the onset of the disease, almost the only cellular elements were the polynuclear leucocytes. Later the large epithelioid cells of the meninges were found among the pus-cells, often enclosing them. A small number of lymphoid cells were found in many cases, and were numerous in the chronic cases. No ill effects were seen from spinal puncture. Dr. Williams believes that the withdrawal of the exudation may be of positive benefit to the patient. A note in the history of one case says the patient became much quieter and slept after the operation. Too much cannot be said of the importance of the procedure in making the diagnosis of the disease. There should always be a microscopical and bacteriological examination of the fluid obtained in order to ascertain what organism is present. Acute meningitis may be due to a variety of organisms, and it is important to know which is present. This knowledge is certainly useful in making the prognosis, and in the future it may be of importance in the treatment.

The pathological anatomy of acute cerebro-spinal meningitis first began to be carefully studied in the French epidemics from 1840 to 1845. The most careful study of the lesions of the disease has been made by the Germans in the epidemics which have prevailed in various places in Germany from 1865 up to the present time.

We have carefully studied the lesions in the tissues in the thirty-five post-mortem examinations made during the epidemic. In most cases post-mortem examinations were made but a short while after death. When the period was longer most of the bodies had been kept, preceding the examination, in a room cooled by a freezing process to from 32°

to 35° F. At every post-mortem examination where it was possible cultures were made from the brain, cord, heart, lungs, liver, kidneys, and spleen. For general histological purposes, portions of the brain, cord, and other organs were hardened both in Zenker's fluid and in alcohol. For the study of nerve degeneration small pieces of tissues were hardened in Müller's fluid or in formaldehyde, followed by Müller's fluid, before staining in Marchi's solution.

For the study of the distribution of the diplococcus and of the histological changes in the tissues, eosin followed by Unna's alkaline methylene-blue solution was found to give by far the most satisfactory stain. The advantage of Unna's solution, which is more alkaline than Löffler's, is that it stains bacteria and nuclei in tissues hardened in Zenker's fluid, which gives a much more perfect fixation of the tissue elements than either alcohol or sublimate. The tissues were almost exclusively embedded in paraffin. The crystals of corrosive sublimate were removed from the sections after cutting so as to avoid prolonged treatment with iodine, which acts injuriously.

In the cases on which post-mortem examinations were made the duration of illness varied from two days up to seventy-four days. The average duration, leaving out of consideration the very chronic case of seventy-four days, was eleven and one-third days; the time not being taken from the stay of the patient in the hospital, but from the initial symptoms of the disease. The duration was really much less than this for the average number of cases, being greatly increased by seven cases, which were twenty-three, thirty-two, twenty-three, thirty-seven, twenty-nine, thirty, and twenty-six days, respectively. Leaving out these and the seventy-four day case, the average duration was six and one-half days, which can be taken as the average length of time of the acute cases, while twenty-eight and a half days can be considered as an average of the chronic cases, here again leaving out the exceptional case of seventy-four days.

The condition of the body varied in the acute and chronic cases. In the acute cases the body was generally well nourished, and in some there was an abundant development of adipose tissue. The chronic cases presented an almost characteristic appearance; the body being greatly emaciated, the skin pale, the abdomen sunken, and the muscles thin and pale. In one case, which was of six days' duration, there was a decubitus over the sacrum. Evidences of herpes and other skin lesions were not as apparent on post-mortem examination as they were during life. In one case there was a perfectly characteristic hemorrhagic eruption over various parts of the body.

Lesions of the nervous system. The lesions produced by the disease may be divided into those affecting the meninges, those affecting the tissues of the brain and cord, and those affecting the cerebral and spinal

nerves. The pathological process in the meninges consists in inflammation with purulent, sero-purulent, and fibrino-purulent exudation. The most marked lesions were found at the base of the brain, extending from the optic commissure backward over the crura, the pons, and the medulla. The meninges of the entire brain area were rarely affected. In the most acute cases, in those dying within two or three days from the onset, the conditions were not so marked as in the more prolonged cases. In these very acute cases there was but little exudation. The bloodvessels of the pia-arachnoid were intensely injected, the large bloodvessels appearing as red lines, and the entire surface of the brain had a pinkish hue, due to injection of the smaller vessels. The exudation appeared in yellowish lines in the sulci along the vessels, and in some cases there was but slight cloudiness. In the more advanced cases, those dying from five to twelve days from the onset, the amount of exudation was much greater, and it contained more fibrin. In the chronic cases in which death took place in from fifteen to thirty days from the acute onset, the appearance of the meninges differed widely from that in the acute. The most marked change was œdema and general thickening of the meninges. There was but little evident exudation, yellowish circumscribed foci scattered here and there in the sulci marking the remains of it. The meninges at the base were opaque, enormously thickened, and there were bands of organized tissue extending from point to point. The inflammation was confined to the pia-arachnoid. The adjoining surface of the dura was smooth, and the vessels were but little injected save in the dura of the cord. There were few lesions in the tissue of the brain and cord apparent to the naked eye, and, without careful microscopic examination, lesions, which must be regarded as among the most important of the disease, would have been overlooked. These lesions of the brain and cord were less marked in the most acute cases. In the more advanced cases the surface of the ventricles had lost its glistening appearance. It was softer, sometimes almost mushy to the touch, and small losses of substance or a more or less ragged or uneven condition of the surfaces were found. The general consistency of the brain was but little altered. It may be somewhat softer to the touch, owing to the dilatation of the ventricles, and there may be œdema. Foci of softening and of hemorrhage were found in the tissues of the brain, but there was no definite abscess formation. The cranial nerves were affected to a greater or less degree in all cases. Those most affected were the second, fifth, seventh, and eighth. The Gasserian ganglia were removed in a number of cases, and in all they were found swollen and softened.

The results of the microscopic examination of the tissues differ according to the acuteness of the process. In the most acute cases, in which there was but slight change to the naked eye, the lesions consisted in purulent infiltration of the meninges. The leucocytes in the exudation

were almost exclusively polynuclear. In some places they were closely packed together; in others they were found scattered in a finely granular mass which evidently represented a coagulated albuminous exudation. No eosinophile cells were found in the exudation. In more advanced cases the number of cells was much greater, and they appeared in large masses in the meshes of the tissue. Many of these cells, particularly those in the middle of the masses, were swollen and granular, and the nuclei either stained imperfectly or not at all. There was more fibrin than in the more acute cases. It appeared in masses by itself, or as a delicate network among the pus-cells. In one case it had undergone hyaline metamorphosis in places. It was never present to the same extent as in other forms of meningitis, particularly that produced by the pneumococcus. In addition to the leucocytes there were large cells from two to eight times the diameter of a leucocyte. They were present to some extent in all cases, but very few were found in those most acute. The nuclei of these cells were large and vesicular; the protoplasm stained very faintly and was finely granular. It was difficult to make out the protoplasm of these cells, for they were filled with other cells which they had taken up. Polynuclear leucocytes, often in considerable numbers, were found in these cells. The enclosed leucocytes were most often in a vacuole in the large cell, and a clear space could be seen around the periphery of the enclosed cell. The protoplasm of these enclosed cells gradually disappears, the nucleus breaks up into irregular masses of chromatin, and some large cells were found filled with irregular chromatin fragments. The formation of these large cells from the cells of the connective tissue and from those lining the lymph spaces in the tissue could easily be followed. Numerous nuclear figures were found in such cells. In the chronic cases the exudation was of much slighter extent. The meninges were converted into thick, dense masses of tissue resembling cicatricial tissue containing but few cells. In the place of the abundant exudation in the acute cases, masses of degenerated pus-cells and nuclear detritus were found. In various places there were collections of lymphoid and plasma cells around the vessels. The lesions in the tissue of the brain and cord were interesting on account of their frequency, their general bearing on pathological processes, and from being most marked in the particular form of meningitis which is produced by the diplococcus intracellularis. The lesions were most evident in those cases in which from five to ten days elapsed from the onset of the disease until death. In places there was a circumscribed infiltration of the tissue with pus-cells which extended downward from the infiltration in the meninges. The spaces around the dilated vessels were often filled with pus-cells which extended from here into the surrounding brain tissue. In addition to the infiltration around the vessels, single pus-cells were found in the brain tissue, apparently remote from the areas of infiltration. In two cases there was extensive

softening, with purulent infiltration and hemorrhage in the cortex of the cerebellum. In these places the cortex was represented by granular masses scattered among the pus-cells and hemorrhage, and the cells of Purkinje had disappeared or only granular fragments representing them were found. The areas in the white matter which showed macroscopically as hemorrhages, under the microscope appeared as foci of fine hemorrhages with but little infiltration with pus-cells. In one case there was an acute focus of softening with purulent infiltration in the pons just over a thrombus in the basilar artery. In this area the tissue was distinctly broken down, necrotic, and infiltrated with pus. In several of the chronic cases in which there were marked thickening and cellular infiltration of the meninges, the same cellular infiltration was found around the vessels extending into the tissue.

The most interesting changes in the brain concern the neuroglia. The most marked changes were found in the cortex beneath the ventricles and in the neighborhood of the foci of softening. With a low power there was a distinct increase in the cells of the cortex outside of the ganglion cells. The neuroglia cells were swollen; their nuclei were large, clear, vesicular, and contained much chromatin. Around these large nuclei there was a faintly stained irregular mass of granular protoplasm. Many of the cells contained two nuclei, and in places there were groups of four or more nuclei closely clustered together, with a considerable amount of protoplasm around them. In all of these places numbers of nuclear figures were found. They presented the same forms as other multiplying nuclei, and in some cases the spindles and centrosomes were distinct.

For the recognition of these nuclear figures much depends either on the condition of the tissue or the period of the disease. They were numerous in some specimens, while in others in which there was evident proliferation they could be found only after prolonged search. In some of the places where the proliferation was most marked there was some infiltration of the tissue with pus-cells; in others the nuclear figures were found at a distance from such infiltrations and in apparently normal tissues. The greatest increase in the neuroglia was found around the foci of hemorrhage and cellular infiltration in the white matter. In every case proliferative changes in the neuroglia were found in the tissues adjoining the ventricles. Even where the ependymal lining was preserved the cells were closely packed together, the nuclei were large, and proliferation had evidently taken place, but no definite nuclear figures were found.

Marked changes in the neuroglia of the cord were found in but one case. In this the changes were most evident in the gray matter of the cord. These neuroglia changes were accompanied by changes in the connective tissue. The cells of the bloodvessels were swollen, in-

creased in number, and nuclear figures were found in them. In the same field nuclear figures were often found in the neuroglia cells and in the cells around bloodvessels. In the small hemorrhagic foci the walls of the vessels were often found infiltrated with large epithelioid cells, together with lymphoid and plasma cells. A definite formation of connective tissue proceeding from this proliferation around the vessels was not found, save in one chronic case, and in this the process had advanced so far that the steps in the formation of connective tissue could not be followed.

Examination of the ganglion cells showed slight changes in these. These changes consisted in an alteration of the cell granules, accompanied with irregularity in shape, and often atrophy of the body of the cell. In some of the sections which were hardened in Fleming's solution, and in some hardened in Müller's fluid, and subsequently treated by Marchi's method for degeneration, fatty degeneration was found in the cell protoplasm. Diplococci were found in variable numbers in the meninges in the brain and cord, and were less numerous in the cord. They were always most numerous in the acute cases where the exudation was composed almost wholly of pus-cells. Variable numbers were found in the single cells, but cells wholly filled with them, which were so common in the alveoli of the lungs, were rarely found.

The most marked lesions in the nerves were found in the second, sixth, and eighth. Lesions of the optic nerves were due to an extension of the inflammatory process from the meninges. The subdural space of the nerve was dilated, but usually contained no cellular exudation. Just as in the brain, the purulent exudation was found in the pia-arachnoid of the nerve. This was infiltrated with pus, and there were masses of pus-cells in the membrane, chiefly around the retinal artery after this had entered into the nerve sheath. In a longitudinal section of the nerve involving the retina the infiltration could be followed from the meninges of the nerve into the eye. In acute cases the cells in the meninges of the nerves and extending between the nerve bundles were polynuclear leucocytes. In more chronic cases along with the pus-cells there were numerous large epithelioid cells similar to those found in the meninges of the brain. Changes similar to those in the optic nerve were found in the olfactory nerve and the bulb, but the cellular infiltration between the nerve bundles was not so marked in this as in the optic nerve. In both optic and olfactory nerve proliferative changes in the neuroglia, similar to those described in the brain, were found. Sections of the eighth nerve in acute cases showed this to be embedded in a mass of pus, the nerve-sheath softened, broken up, and in places entirely lost. The nerve itself was infiltrated with pus-cells, partly in the form of longitudinal lines, partly as a more diffuse infiltration. In the more chronic cases there were fewer pus-cells, and in place of them lines of

epithelioid and plasma cells. The seventh nerve frequently showed as great a degree of infiltration as the eighth. Some infiltration was also found along the third and sixth nerves, but it was not so marked. The fourth nerve was examined in but one case, and showed no infiltration. Longitudinal sections of the fifth nerve, involving the ganglion and some of its branches, showed an intense neuritis on the cerebral side of the ganglion. The single bundles of fibres were widely separated from one another, and between them there was considerable exudation in which there were numbers of pus-cells and epithelioid cells.

Sections of the nerve-roots of the spinal cord showed these affected in every case examined. As a rule, the greatest degree of affection of the nerve-roots was found in that part of the cord where the cellular infiltration was greatest, although in some cases a considerable degree of involvement of the nerve-roots was found with but little cellular infiltration of the meninges. Even in the most acute cases these changes in the nerve-roots of the cord were accompanied by proliferative changes in the peri- and endoneurium. The cells of the bloodvessels were swollen, increased in number, and around the bloodvessels along with the pus-cells there were numbers of large epithelioid and plasma cells. Lymphoid cells were comparatively few in number. The greatest amount of nerve-degeneration, as shown by the Marchi method, was found in the optic nerve in one case, and in the eighth nerve in another. In every case degeneration was found in the spinal nerve-roots and was more marked in the posterior than in the anterior nerve-roots. A minor degree of degeneration was found in the nerves of the cauda equina and in the popliteal nerves. In one of the cases a section treated for degeneration was made through the nerves and muscles of the orbit. All showed more or less marked degenerative changes, the optic and the sixth nerve being most affected. The ocular muscles in the section showed advanced fatty degeneration.

In five cases sections were made of the Gasserian ganglia, and of the spinal ganglia in two cases. In the acute cases the Gasserian ganglia were infiltrated with pus, and masses of ganglion cells were found separated from their connection. Single ganglion cells were found lying free in the exudation. Various degrees of degeneration and even complete destruction of these cells was often found. The spinal ganglia were not affected to the same extent as the Gasserian. All seemed to be somewhat swollen and œdematous, but in some this condition was much more marked than in others. The bloodvessels were injected, the ganglia infiltrated with pus. Sections of the ganglia, including longitudinal section of the nerve-roots in connection with it, showed these to be infiltrated with pus. The rapidity with which these changes in the ganglia can take place was shown in a section of the spinal ganglia of a goat which died not later than twelve hours after inoculation in the

spinal canal. In one of the ganglia examined there was a beginning purulent infiltration.

Sections of the eye were examined in two cases, in one of which choroïditis, cloudiness of the cornea, and conjunctivitis were found during life. There was a purulent infiltration of the eye extending from the optic nerve. All of the vessels of the choroid were intensely injected, but there were few hemorrhages and no purulent infiltration. The retina on either side of the optic nerve was broken up and infiltrated with pus. The vitreous was filled with a large amount of pus, made up entirely of polynuclear leucocytes. None of them contained eosinophile granules. The largest mass of this pus was adherent to the iris and retina. The anterior chamber contained a large amount of pus. The tissue of the iris was œdematous and infiltrated with pus-cells. No evidence of proliferation was seen in any of the pigmented cells of the iris or ciliary region. Sections passing through the cornea showed the fibres of this separated, and the tissue contained a great amount of pus-cells lying in the corneal spaces. Diplococci were found in large numbers in the pus-cells in the vitreous and anterior chamber.

The condition of the lung is interesting on account of the relation which has very generally been supposed to exist between epidemic cerebro-spinal meningitis and pneumonia. In thirteen cases there was merely congestion with more or less œdema. In seven cases there was broncho-pneumonia, more marked in the lower posterior portion of the lung. In two cases there was characteristic croupous pneumonia; one in the stage of red hepatization bordering on gray. Pneumococci were found in these cases in cultures and on microscopic examination. In eight cases pneumonia due to the diplococcus intracellularis was found. Nearly all of these cases came from the last part of the epidemic. It is very possible that some of the earlier cases in which the lesions were described simply as broncho-pneumonia were really due to the diplococcus intracellularis. The lung lesions consisted macroscopically of areas of consolidation in various parts of the lung, more particularly in the lower lobe, and they were most numerous beneath the pleural surface. The foci varied in size from a pin's head up to that of a pea, and on section some of them resembled small hemorrhages in the tissue.

In other cases the periphery of the area was distinctly hemorrhagic and the centre opaque and yellowish. In one case the consolidation of the lung was so extensive that it might easily have been regarded as croupous pneumonia, particularly as the pleura over it was covered with a definite fibrinous exudation.

On section, this large area was composed of a number of irregular grayish foci, with softened centres and with hemorrhagic and œdematous tissue between them. The lung tissue in the yellowish centres was frequently broken down, and pus oozed from this. On microscopic exami-

ination the central areas showed in most cases a purulent infiltration of the tissue with beginning abscess formation. The alveoli contained large numbers of pus-cells; their walls were infiltrated with pus and in places entirely broken down. The foci of consolidation did not appear to be bronchial in origin. The bronchi in the vicinity often contained pus-cells, but their walls were not infiltrated.

The duration of the disease in the cases in which diplococcus pneumoniae was found was: in two cases, three days; in two cases, two days; in two cases, fifteen days; in one case, nine days; in one case, twenty-three days, and in one case, seventy-four days. It will be seen from this that the lung complications due to the pneumococcus can take place in almost any period of the disease. In the case of seventy-four days' duration, the lesion in the brain and cord could be regarded as almost completely healed, and the lesions in the lungs were acute. In one case in which, from the history as given by the relatives, the disease was only two days in duration the lesions in the lungs were so advanced that they seemed possibly to antedate those of the brain, providing the history as given by the patient's relatives was correct. Immense numbers of diplococci were found in the pus-cells in the lung. They were most numerous in the cells in the centres of the foci where softening was taking place. In the centre of one of the foci a small branch of the pulmonary artery was found occluded by a thrombus formed of pus-cells containing large numbers of diplococci. It seems probable that this thrombus may have come as an embolus from the meninges, and may have produced an infection of the surrounding tissue.

There was great variation in the size of the spleen. In general it was not much enlarged, and was probably smaller than in most of the acute infectious diseases. In only three cases was it found considerably enlarged. The average weight in the adult cases was 163 gms. The lymphatic glands in the uncomplicated cases were never found enlarged.

The liver presented no change beyond acute degeneration. In two cases extensive acute lesions were found in the kidneys. In one of these the kidney lesions had no connection with the meningitis, but were due to an accompanying infection with diphtheria. In the other case there was an acute hemorrhagic nephritis. In this there was an accompanying acute pericarditis, the organism causing which could not be ascertained. The only lesions found in the kidney which could be properly attributed to the meningitis were acute degenerative lesions which were always present.

The intestinal canal was found normal in every case.

In two cases there was acute pericarditis accompanied in one case with foci of necrosis and purulent infiltration of the myocardium. In several other cases in which the myocardium was examined histologically it was found normal.

Lesions of the skin were found in but one of the cases on which post-mortem examination was made. In this case over the upper and lower extremities, chest, and abdomen, there were numerous small dark purplish spots in the skin, varying in size from a pin's head up to that of a pea. On microscopic examination of these areas there was intense congestion and dilatation of the bloodvessels of the skin, with small and diffuse hemorrhages immediately beneath the epithelium. In some of the larger areas there was some purulent infiltration in the centre. No diplococci were found in these lesions.

With a view of ascertaining the frequency, together with the clinical and anatomical features, of cerebro-spinal meningitis due to other organisms than the diplococcus intracellularis, we have collected a number of cases from the reports of the laboratory for the past five years. Most of these cases come from the Boston City Hospital, but a number of them are from private post-mortem examinations, and the bacteriologic and histological examinations were made at the Sears Pathological Laboratory of the Harvard Medical School.

We have found meningitis apart from the epidemic form to be most commonly caused by the tubercle bacillus, the pneumococcus, and the streptococcus. In one case, the entire history of which is very imperfect, there was a mixed infection with the bacillus pyocyaneus and the staphylococcus aureus, and in another case the infection was due to the anthrax bacillus. In most of these cases the meningitis was secondary to infection elsewhere, which fact complicates the clinical history relating to the meningeal symptoms. In ten cases the pneumococcus was found and so associated with the lesions of the disease that it can certainly be regarded as primary. In eight of these cases the meningitis was secondary. In two there was fracture of the base of the skull extending across the temporal bone, the organisms evidently gaining entrance into the meninges from the middle ear. In one there was otitis media with necrosis of the bone, and pneumococci were found in both the pus from the ear and in the meninges. In three the meningitis was secondary to acute croupous pneumonia, and in one to acute fibrinous pericarditis. In one case there was broncho-pneumonia and thrombosis of the longitudinal sinus. In two the thickening of the meninges was primary. No other lesions due to the organism have been found in the body.

The records of the post-mortem examinations show some difference in the amount and distribution of the exudation in the meninges. In one case secondary to acute croupous pneumonia there was only a slight purulent fibrinous exudation over the base of the brain, extending a short distance over the lateral convexity on each side. In another case there was an extensive exudation over the base and over almost the entire surface of the brain. The exudation was usually confined

to the meshes of the pia-arachnoid, but in one case it is said to have been both in the membranes and on the surface. The microscopic examination showed considerable difference in the lesions here as compared with the epidemic form. There is a large amount of fibrin present in the exudation. The large cells enclosing numbers of leucocytes which were so prominent in the exudation in the epidemic meningitis were generally absent.

The most marked feature in both the pneumococcus and streptococcus meningitis is the acute endarteritis. The condition is similar in kind to the vascular lesions which have been described in tuberculosis of the meninges. The condition of the circulation in the vessels which were affected could not be ascertained.

In many of them there seemed no other change than an acute inflammation of the wall. In some the lumen was filled with cells, chiefly leucocytes, and in others there was a mass of fibrin and red blood-corpuscles. The inflammatory change consisted essentially in an accumulation of cells between the endothelium, which was generally elevated in festoons, and the elastic lamina. In some places these cell accumulations were so great as to occlude the lumen of the vessel, and in others so slight that they might escape notice. The new cells were principally polynuclear leucocytes, but among them were seen larger cells of an epithelioid character. It was not possible to ascertain the origin of the larger cells in the specimen we have. The muscular coat in most cases was unchanged; in others it was partially invaded by leucocytes.

The clinical history of the eight cases in which meningitis was secondary to other conditions did not throw a great deal of light on the symptoms to be attributed to the meningitis. The symptoms referable to this were complicated with symptoms due to other lesions. Vomiting was found in but four cases. Delirium was less common than in the epidemic cases, and in four cases there was unconsciousness. In one of the cases of pneumonia in which there was an extensive exudation in the meninges there was nothing in the symptoms to point to this.

In general, it may be said that the difference between the clinical history of pneumococcus meningitis as compared with the epidemic form is in the absence or slight development of symptoms in the pneumococcus form which pointed to extensive infection of the meninges of the cord and spinal roots, and extension of the infection along the cranial nerves. At the same time it must be remarked that our observations are not sufficiently numerous to make any extensive generalizations.

In two cases the meningitis was primary. In one case, a well-nourished and well-built child of ten months, the disease began with restlessness, high fever, and vomiting, and the temperature continued high until

death, three days after the onset. The other case was that of a child who was taken when six days old with general clonic convulsions, accompanied by a temperature of 104° in the first twelve hours, which afterward dropped to 102° . Death occurred on the second day.

There were eight cases of meningitis due to the streptococcus, and in all the meningitis was secondary to infection elsewhere. In four cases the primary infection was in the ear, and in two of these there was thrombosis of the lateral sinus. In one the meningitis represented an extension to the meninges of erysipelas of the face and scalp. In one case there was acute endocarditis, and in one the meningitis was secondary to an alveolar abscess. One case was of especial interest in showing an infection which doubtless took place from the nose. In this case there was a fracture of the base of the skull extending across the cribriform plate of the ethmoid bone. Pus-cells and streptococci were found in the nose.

In all these cases the lesions in the meninges were very similar to those found in the pneumococcus infection. The exudation was purulent, with a very variable amount of fibrin, usually not so much as in the pneumococcus cases. The acute endarteritis was well marked, and there was no extension of the process into the brain.

The clinical histories of these cases of the streptococcus meningitis do not show anything of especial importance. Opisthotonos was found in but one case, and was not well marked. Pain and stiffness of the neck were found in two cases.

Symptoms referable to the eyes were noted in three cases.

There was one case of meningitis due to the anthrax bacillus. The case was that of a man, about forty years of age, who was a teamster engaged in handling hides. He had a carbuncle on the neck, which was removed by operation. Infection of the alimentary canal probably took place through the instrumentality of his fingers, which he was constantly putting into his mouth to feel an inflamed tooth. At the post-mortem examination there were thirteen carbuncles at various places in the intestinal canal, and an acute hemorrhagic meningitis with focal hemorrhages throughout the brain. The exudation in the meninges was distinctly hemorrhagic, and numerous anthrax bacilli were found in the tissue.

There is no doubt that acute meningitis may be produced by the entrance into the meninges of a number of infectious organisms. These forms are rarely primary. The organisms enter the meninges either by the formation of a communication between the meninges and some cavity where they may be accidentally present (as in the middle ear or nose), or by the extension to the meninges of an infectious process in the vicinity (mastoiditis, erysipelas), or they are brought to the meninges by the blood from some other focus in the body (pneumonia, endocard-

ditis). In tuberculous meningitis we have never found a single case in which the lesions in the meninges could be regarded as primary. The only two cases of apparently primary infection were in the two pneumococcus cases noted, and in one of these the infection may have come from the intestinal canal. We believe that all infections of the meninges other than the diplococcus intracellularis are fatal, but this can only be determined by microscopic and bacteriological examination of the exudation obtained during life by spinal puncture. If tubercle bacilli, pneumococci or streptococci are found with the evidences of meningitis in a case which recovers, it would settle the point; clinical evidence without lumbar puncture will not.

IMPLANTATION OF THE URETERS INTO THE RECTUM IN EXSTROPHY OF THE BLADDER, WITH A DESCRIPTION OF A NEW METHOD OF OPERATION.¹

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THE unsatisfactory character of the results following operations designed for the restoration of the anterior bladder wall in exstrophy of that organ has led surgeons to abandon these procedures. Among the most successful of the flap-operations is that introduced by Dr. Daniel Ayres, the immediate result, when the operation is finally accomplished, being to close the defect with skin-flaps in two layers, the cutaneous surface of one of which is directed toward the mucous membrane of the posterior wall of the bladder, the expectation being that this would finally perform the function, to a greater or less extent, of the normal lining of the bladder-wall. The final outcome of these attempts, in my experience, has been far from satisfactory. The growth of hair upon the vesical surface of the skin-flap which forms the anterior bladder-wall leads to the formation of calculous material and the necessity for further and repeated operative interference.

The constant flow of urine, despite every effort to divert this to an artificial channel opening upon the perineum frequently negatives efforts to obtain healing, whether these are directed toward remedying the defect by simple flap operations of the Ayres type or closure of the accompanying gap in the pubic symphysis, after the manner of Trendelenburg.

Trendelenburg's operation consists of a separation of the sacro-iliac articulation, in order to correct the pelvic bony fissure, and a direct

¹ Read before the Brooklyn Surgical Society, November 4, 1897.

suturing, after preliminary freshening of the edges, of the defect in the soft parts. König and Küster modified the procedure by substituting osteotomy of the anterior pelvic ring for forced separation of the sacro-iliac junction.¹ These procedures, as acknowledged by their originators, are exceedingly difficult of execution, and the resulting wounds are especially liable to become infected. Passavant proposed to accomplish closure of the pelvic bony gap by the application of "brissement forcé" under an anæsthetic. C. T. A. Koeh, of Gronigen (Netherlands) succeeded in carrying out Passavant's proposition in a child of six years, the defect in the soft parts being closed by suturing the edges of the latter six weeks later. The case was reported one week following the second operation.²

In one of the most recent communications upon the subject, that of Tietze, of Mikulicz's clinic, all attempts to close the bony defect are abandoned, and the method of closure by lateral flaps is advocated.³

Even when the exstrophy of the bladder and the accompanying epispadias have been corrected, the patient's condition is not greatly improved. Attempts to restore the function of the muscular apparatus of the vesical neck have thus far yielded unsatisfactory results; a condition of incontinence persists, necessitating the wearing of an apparatus to lead the urine to a receptacle fastened to some part of the patient's body. Such an instrument is difficult of perfect adjustment, and this, together with its uncleanness, in spite of every care, contributes to render the patient an object of disgust, both to himself and his friends.

These considerations impelled Maydl to suggest the application of ureteral implantation into the rectum in this class of patients.⁴ This operation, designed to divert the urine from its normal course, however, has not met with marked favor among practical surgeons, on account of the threatened dangers of renal infection which the procedure invites. That these fears are not of a purely theoretical nature has been amply proved by the published clinical experiences, as well as the results of experiments upon lower animals, of Gluck and Zeller, Bardenheuer, Tuffier, Smith, and others. More recently, however, attempted improvements in the technique of the operation have awakened renewed interest in the subject, these improvements being particularly designed to furnish protection against infection of the kidneys through the open mouths of the ureters, as these present themselves into the cavity of the rectum.

Four operative procedures have been recently brought forward with this end in view. The first of these, that of Maydl,⁵ is designed to take

¹ Twenty-fifth Congress of German Surgeons.

² *Centralblatt für Chirurgie*, 1897, xxxvi, p. 952.

³ *Beitr. z. klin. Chir.*, Tübingen, 1897, xviii, p. 1-28, 2 pl.

⁴ *Wien. Med. Wochenschr.*, 1895, xlvii, pp. 1241, 1317, 1376.

advantage of the oblique course of the ureters upon the bladder-wall before entering the bladder, together with whatever safeguards are afforded by the arrangement of the mucous membrane of the bladder-wall at the vesical orifices of the ureters. The method of accomplishing this consists in transplanting the *bas fond*, together with the ureters, into the rectum. The second consists in implantation of the ureters into the space occupied by the submucous connective tissue of the rectal wall, turning back a triangular-shaped flap, in a lateral direction for that purpose. A small opening is made in the mucous membrane for the passage of urine, and the flap is replaced and sutured (Krynski).¹ The third, the operation of Vignoni,² is recommended upon the basis of experiments upon animals, and aims to provide a V-shaped valve cut from the anterior wall of the bowel. After placing the ureters upon the flap, the former are covered by suturing over them two lateral folds of the bowel-wall. The fourth consists in transplantation of the bladder-wall at the sites of the ureters to the *posterior* wall of the rectum, through an incision in its anterior wall, a portion of mucous membrane having been removed in order to secure a freshened area for that purpose (Pisani³). The remainder of the bladder is extirpated.

In regard to the first-named, viz., the operation of Maydl, it may be said that the attempt to gain the advantages of pressure afforded by the arrangement of the ureters upon the bladder-wall, as well as whatever aid may be afforded by supposed valve-like folds of the vesical mucous membrane at the mouths of the ureters, are lost when the *bas fond* is transplanted into the rectum. The rectum proper is not a closed cavity in the sense that the bladder is, and accumulating urine cannot exercise pressure to the extent that this occurs in the case of the normal urinary viscus. In addition to this, the procedure requires an extensive dissection of the parts about the base of the bladder.

The second method, that of Krynski, places the ureters in the space occupied by the submucous connective tissue of the rectum. In order to gain access to this, a flap of the serous and muscular coats of the rectum is turned back, being afterward replaced and sutured. No valve is provided for at the mouths of the ureters, reliance being placed entirely upon the pressure of the rectal contents in occluding the ureters beneath the mucous membrane and above their point of entrance into the rectum. Pressure exercised in this manner, as has been shown, is fallacious in accomplishing its object.

In the third, or Vignoni's operation, while an effort is made to secure a valve for the prevention of regurgitation of urine into the ureter, this valve is covered upon its surface presenting to the mouths of the ureters

¹ Centralblatt für Chir., 1896, xxii. 73-75.

² Ibid., iv. p. 85; Gaz. med. di Torino, 1895, xlv. 17-25.

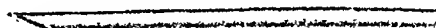
³ Ibid., 1897, xxii. p. 631; Pollicin., Roma., 1896, iii. p. 333-338.

by serous membrane. The objectionable feature of this method resides in the liability of stenosis of the orifices of the ureters occurring through adhesions between their cut ends and the serous covering of the flap.

The fourth method, that of Pisani, is based upon a supposed sphincter-like action of the vesical mouths of the ureters. In this operation the ureters cross the rectum in an antero-posterior direction, and in this situation may readily form a more or less marked obstruction to the passage of feces. In addition to this, the supposed sphincter-like action of the ureters is alone relied upon to prevent the passage of feces into the ureters.

The method herewith presented is an effort to combine an efficient valve-action with the additional safeguard of compression of the ureters by the circular muscular fibres of the bowel during defecation. The operation is performed as follows: The abdomen is opened in the median line, with the patient in the Trendelenburg position. The anal sphincters are dilated and the rectum should be thoroughly cleansed preliminarily. The ureters are identified in their relations to the vessels, the posterior layer of the peritoneum incised for a sufficient extent to expose them freely, and the ureters traced to their terminations upon the bladder-wall, from which they are detached. The ends of the ureters are cut off obliquely (Fig. 1).

FIG. 1.



The obliquely cut ureter.

A longitudinal incision, 7 cms. long, is now made in the anterior wall of the rectum, only the serous and muscular coats being included in this incision. These structures are dissected laterally until the mucous coat is bared and a diamond-shaped space in the submucous space exposed (Fig. 2). The edges of the incision are retracted by thread retractors, and a tongue-shaped flap of mucous membrane, with its base directed upward, is cut from the mucous membrane in the lower half of the diamond. This tongue-shaped flap is doubled upon itself in an upward direction in such a manner that one-half of its mucous surface presents anteriorly, when it is secured by one or two catgut sutures. A flap-valve is thus secured, both sides of which are covered with mucous membrane.

The ureters are now placed in the incision, so that their obliquely cut ends lie upon the presenting mucous membrane surface of the flap (Fig. 3). A few fine catgut sutures serve to secure the ureters in position in the space represented in the upper half of the diamond, care being taken that these sutures do not invade the lumen of the ureters. The flap-

valve and attached ends of the ureters are now pushed into the cavity of the rectum, and the rectal wound closed in the following manner: The gap in the mucous membrane left by the reflected half of the tongue-shaped valve is first closed by a row of catgut sutures (Fig. 4). The original wound in the rectal wall is closed by fine silk sutures, the upper two or three of these being likewise utilized for still further securing the ureters for the distance which they pass in the submucous space in the upper half of the diamond (Fig. 5). The abdominal wound is now closed.

FIG. 2.

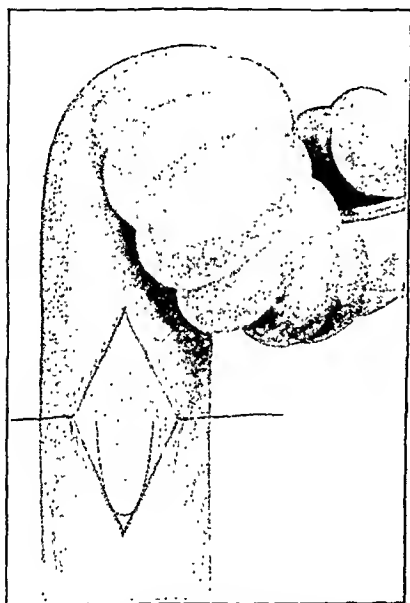


FIG. 3.

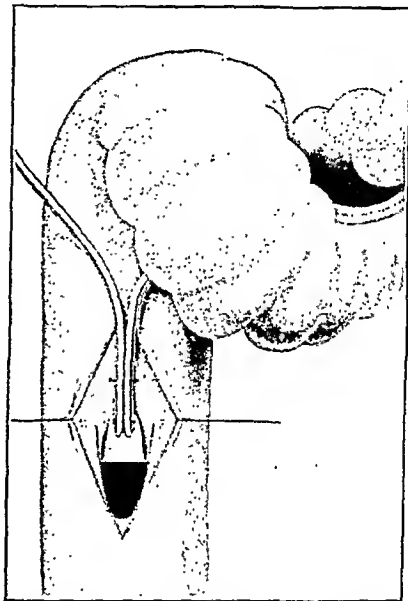


FIG. 2.—Incision on anterior wall of the rectum, including serous and muscular coats. Mucous membrane exposed in a diamond-shaped area, and the edges of the incision retracted by thread retractors. The dotted line shows line of section of mucous membrane to form the tongue-shaped flap.

FIG. 3.—Tongue-shaped flap cut, turned up, and laid upon itself (doubled back). The ureters are placed with their obliquely cut ends lying upon the surface of the flap and secured by catgut sutures in the space in the upper half of the diamond.

A boy, aged six years, referred to me by Dr. McCleary, of this city, was subjected to this operation on September 20, 1896, at the Brooklyn Hospital. Prompt recovery followed the operation. The rectum became remarkably tolerant of the presence of urine from the first day following the restoration of the sphincters, urination taking place per rectum on an average of every three hours. As time passed this toleration became more pronounced, until, at the present time, the intervals do not average more than the normal.

A remarkable fact, brought out by the after-history of this case, is the manner in which the howel performs its double function as a receptacle for both feces and urine. While urination takes place at about the normal intervals, defecation likewise takes place at normal intervals, although the former occurs about once in six hours, while the latter occurs but once daily. The movement is generally formed, and is not mixed with or accompanied by urine, as far as gross appearances can determine.

FIG. 4.

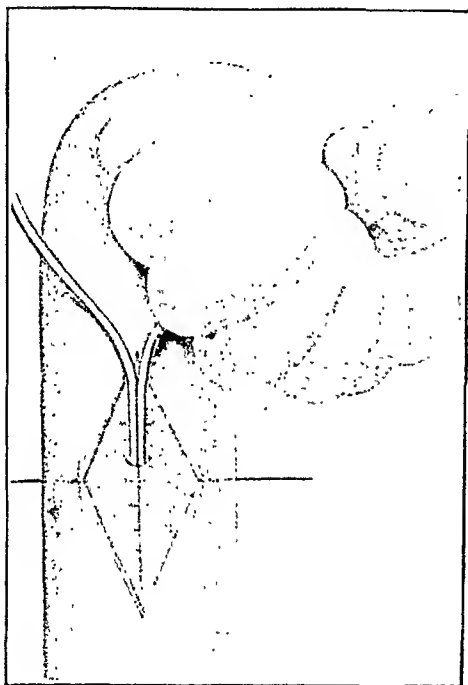


FIG. 5.

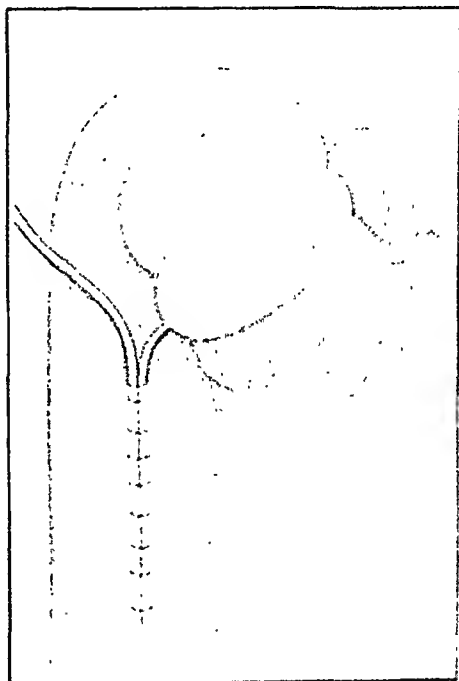


FIG. 4.—Flap-valve and ends of ureters placed in the rectum, and a row of catgut sutures closing the gap in the mucous membrane.

FIG. 5.—Showing the longitudinal incision in the bowel-wall closed by a row of silk sutures. The ureters are shown passing into the upper angle of the closed incision.

In explanation of this the observations of O'Bierne should be borne in mind. This investigator demonstrated by explorations in the human subject that, in the normal state, between the acts of defecation the walls of the rectum are in contact and its cavity practically empty. Under these circumstances, the accumulation of feces takes place above the contracted upper portion of the rectum or at the site of the so-called sphincter of O'Bierne. Every surgeon is familiar with the fact that section or paralysis of the anal sphincters is not necessarily followed by a constant flow of feces; but, on the contrary, this is more or less intermittent, showing that there exists a receptacle for feces above the rectum proper, or at the sigmoid flexure. The act of defecation, therefore, is preceded by the passage of feces from the sigmoid flexure into the

rectum. This sensation of emptying of the sigmoid, followed by the presence of feces in the rectum, gives rise to the desire to evacuate the bowels. Thus there are practically two receptacles at the lower portion of the large intestine: the one the sigmoid, intended for the storage of feces; while the other serves only for its temporary arrest until a convenient opportunity is afforded for its evacuation.

Thus is explained the behavior of the rectum in the case before us. The rectum serves as a receptacle for the urine, while the sigmoid flexure, and the parts above, perform the same office for the feces. This latter is probably favored by the slightly increased narrowing of the gut, which ensues upon closing the gap at the site of the reflected mucous membrane flap.

∴ Ordinary cleansing after each act of urination suffices to prevent excoriations and eczematous conditions in the anal region. The child up to this time (fourteen months) has shown no evidences of renal disturbance.

The advantages claimed for this method of operating are as follows:

1. An efficient permanent valve, with a mucous surface applied to the open mouths of the ureters, is provided. This valve is so situated that it is closely applied to and occludes the open ends of the ureters as the rectum becomes filled with urine, or when fecal matter descends from above.

2. Placing the ureters in the submucous space of the rectal wall for a distance of three or more centimetres above the point where these enter the cavity of the rectum affords an additional safeguard against renal infection. In this situation the circular muscular fibres of the bowel wall compress the ureters and secure occlusion at this point during the act of defecation.

MOUNTAIN FEVER.¹

BY HENRY I. RAYMOND, A.M., M.D.,

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DIFFERENT clinical observers who have recorded their observations upon the etiology and symptomatology of this fever for the past twenty years have classified it nosologically as typho-malarial fever, indicating thereby a mixed infection and committing themselves to the doctrine of hybridity of disease; again, as malarial remittent with adynamic tendencies; and, lastly, as typhoid fever indigenous to mountain regions, its clinical history modified by surrounding physical conditions, the

¹ By permission of the Surgeon-General, U. S. Army.

essential lesions being, however, demonstrable, post mortem, in the spleen, mesenteric glands, Peyer's patches, and elsewhere.

As a contribution toward the solution of this vexed and still mooted question of nosological classification, I offer the following clinical histories of cases occurring in this Rocky Mountain region.

The wide clinical variations of typhoid fever are well known to those who have seen many cases of this disease, even in one locality; but its diversified clinical picture is even more striking to one who has seen the disease manifesting itself under different physical conditions as respects altitude, slope of land, variety of soil, etc., as contrasted between the Eastern valleys and the Western highlands.

CASE I.—Mrs. E. W. R., aged nineteen years, married in November, 1894, came into this region in that month from Ohio, near Gallipolis, on the Ohio River, where malaria was more or less prevalent, but from which she had never suffered (except, perhaps, an occasional slight indisposition which might have been attributable to that cause); had never had typhoid fever, and indeed had never employed a physician since infancy until the present instance.

After four months' residence in this climate she began (about April 1, 1895) to feel listless and indisposed to exertion; this was also her monthly period, the flow being somewhat scanty and continuing but three days.

She had an ulcer on the right side of her tongue, well back, which distressed her considerably and precluded solid food being taken. It healed in about a week under a borax wash, by which time complete anorexia had set in. Her complexion became sallow, especially about the lips and mouth; conjunctivæ also sallow; bowels inclined to constipation. On solicitation of friends she took "liver medicine" and Cuticura Resolvent for the blood, and vegetable laxative pills, in doses of four or five, for three or four times at intervals of three or four days.

These pills had only a mild laxative effect, causing one daily evacuation. On April 20th, in the afternoon, Mrs. R. began to feel chilly every time she stepped to the door, which she did frequently, watching expectantly for letters by the mail-coach. By the time for the evening meal she felt weak and nervous, and while preparing to retire, at 9 o'clock, she had a rather distinct chill, with chattering of the teeth, lasting for five minutes. She took twelve grains of quinine: was restless all night; felt feverish the next morning, but got up and lay about the house on the sofa and couch. She took fifteen grains of quinine, which made her head ring all day; loss of appetite complete; restless the following night, and so thirsty that "water did not seem to quench thirst." The next day (Monday, April 22d) she felt very "sore" in the lower limbs and back, and kept about the bed-room in her wrapper, but could not rest.

She felt better sitting up than lying down, on account of body aches. The bowels were constipated. A dose of liver medicine was taken the night previous as a laxative, but without effect. It was followed Monday morning by five vegetable cathartic pills, which operated the following morning. She had had no headache at any time except that attributed above to the quinine.

On Tuesday morning (April 23d) I saw the case for the first time. Found the temperature 102° F., pulse 110 per minute, regular and of good force and not dicrotic. The patient was sent to bed and kept there for eighteen days (April 22d to May 9th). There had been no epistaxis; no pain nor gurgling (though examined for) in the right iliac fossa. The left knee-joint was so sore as to interdict movement—"felt like rheumatism." In a few hours the other knee and both elbows became painful, and felt as if "it would be a relief if some one would break them or make them crack." These joint-pains kept up for about one week. On the afternoon of the day previous to my seeing her red spots first made their appearance; first noticed on the back of the hands. By morning roseola spots appeared over the body generally. On Monday the spots "covered" the face, each spot being, however, discrete, papular, rose-colored, disappearing on pressure and returning immediately the pressure was removed. Those on the face were the last to appear and the first to disappear.

While the spots increased numerically during the first few days, there was not manifest the cycle of three days for the appearance and disappearance of successive crops; but while many of a given crop would fade away, others of the same crop would persist for ten days or a fortnight; and even one month from convalescence maculae were visible over the hands and feet beneath the sites where roseola papules were previously located.

The tongue throughout the disease had a thick, white coat with red tip and edges. The temperature for the eighteen days ranged between 100° and $103\frac{1}{2}^{\circ}$ F. The temperature-curve was not recorded. Quinine had no perceptible effect on the fever, although a tentative dose of ten grains was administered in the early morning on April 23d.

The patient was not known to have muttering delirium at any time, but felt worse after sleeping; hence she tried to avoid going to sleep through the daytime, and would often wake up frightened and nervous.

The dejections from the bowels for the first few days were dark colored, and then later were of a yellow color and semi-liquid consistence.

There was usually but one movement a day, the tendency to constipation being marked, for these passages were secured only after the administration of compound cathartic pills, as follows: Three on the 25th of April, two on the 26th of April, and one every other day until May 9th, when complete defervescence of the fever took place through a marked diaphoresis occurring the evening before, the afternoon temperature of May 9th being normal. Since convalescence the patient has been in the habit of taking vegetable laxative pills to keep the bowels regulated.

No herpes labialis appeared.

From subsequent experience in finding gurgling in the right iliac fossa in all the eruptive cases, I have no doubt that a little more caution on my part would have elicited it also in this case.

REMARKS. On seeing this case I called the attention of the husband to the similarity of the eruption to the roseolar spots of typical typhoid fever, and he, having recently passed through an attack of that fever in the East, was outspoken in his assertion that this was certainly not a case of that disease. The absence of tenderness over the right iliac fossa and the non-elicitation of gurgling, the presence of jaundice, the

well-nigh obstipation of the bowels, the failure on my part to elicit a careful history of the invasion and progress of the case, led me to regard it as probably a case of malarial remittent fever with hepatic engorgement. This, too, in the face of the fact that I was on the lookout for typhoid fever and was familiar with the article of Surgeon John Van Hoff, U. S. Army, and Surgeon J. J. Woodward's remarks, as published in *THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES* for January, 1880, and treating of cases occurring among troops scouting through this very locality in 1878.

Even the failure of quinine to affect the fever did not dispossess my mind of the supposed malarial origin of the case, I attributing the want of specificity of the remedy to the disproportion between its dosage and the intensity or saturation of the infective element. It was not until late in the treatment of the case that the conviction forced itself upon my mind that I had been dealing with disease processes evoked through the agency of the bacillus typhus abdominalis. My slowness in arriving at this diagnosis, if it be the correct one, will appear less surprising when I state that of the seventy or more cases referred to in this paper and gathered from the practice of the Lander Agency and Post physicians not one-sixth of them was diagnosticated typhoid fever by the physicians who attended them, and many of the cases are still regarded as other than typhoid fever by one or two of the physicians referred to.

CASE II.—F. F., aged twenty-three years, private, Company F, Eighth Infantry, Pole, was admitted into the Post Hospital on account of fever on April 25th, and *again in May*.

Before reciting the clinical history of his three weeks' fever in May I wish to give the history and temperature-record of his previous attacks, together with three other cases of continued fever admitted about the same date, namely, those of Private Hogan (April 21st), Finn (April 20th), and Manning (April 22d).

These four cases occurred in April. Hogan, aged twenty-two years, American, admitted April 21st; had been sick two days before admission; had felt "all broke up;" had had a chill (after fishing and getting wet) that lasted for fifteen or twenty minutes; teeth chattering; "shivering and sweating at the same time;" had had two or three chills on the night of April 19th, with headache, and eyes painful when turned to the right or the left. While in the hospital his tongue was coated with a white fur and bowels constipated; given a Seidlitz powder; had two or three movements a day, which were fluid and of a yellow color. No spots were observed, and indeed were not looked for. Left the hospital May 3d, feeling "strong and well and ready for duty."

Finn, aged twenty-five years; Irish. During his four years' residence in this climate has had headache in early springtime. When admitted (April 20th) yellowish-white coat on tongue; constipated; given Seidlitz powder; had three loose yellow-colored passages the first day; two the next. Had felt sick for nearly a week before coming into the hospital, the sight appearing dim, with dilated pupils. His attention had been called by his comrades in the barracks to the large size of the

blacks of his eyes. No spots were observed, and none indeed were looked for. Remained in the hospital five days, and felt well after going out.

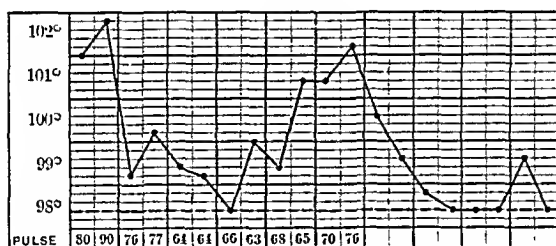
Manning, aged twenty-four years; American. Admitted April 22d; constipated; movements dark and hard; glycerin enema and salts by mouth; passages never fluid nor yellowish as far as observed. No spots looked for.

Fabianski (April 25th). The day previous to admission had felt "awful weak; could hardly stand on his feet;" had had headache and felt restless all night; constipated. On admission had white-coated tongue; laxatives given—compound cathartic pills and Seidlitz powder; dark-green looking passages; on the third day says he felt better; was confined to bed for six days; up and about the ward for four days and then returned to duty. Expressed himself as feeling well and fit for duty. Never had been sick before, as long as he could remember.

These four cases, occurring in April, were carried on the register as cases of malarial remittent fever, the type of fever heretofore met with during my three years' service at this post being intermittents, with one or two exceptions, which were recognized as more or less typical cases of typhoid fever.

I submit a temperature-chart typical of these four cases.

CHART 1.



The return to sick report of Fabianski, on May 18th, with a history of the case, as follows, and the temperature-record subjoined, may throw some further light upon the four cases above cited.

On Monday, May 13th (five days previous to coming on sick report), after wheeling 375 pounds of oats in a barrow, his limbs easily tired, until Thursday morning, on coming off guard after a tiresome walk on post from 3 to 5 o'clock, he felt himself quite worn out. He then lost all appetite; drank only milk and coffee. Came into the hospital Saturday noon, May 18th. On Monday, the 20th, red spots appeared on the arms and feet. On the previous day he had ached all down the spine from the cervical region. On Tuesday his elbows and knees ached; "felt like they were broken off." Eruption became general. Passed flatus per anum, and asked for a Seidlitz powder to make bowels move. None given. Two movements from bowels later in the day. Spleen enlarged. Exclusive milk-diet ordered. On the previous night patient

had been delirious; talked in his sleep, saying that he wished to go to the rear and hoped the nurse would not take his bed.

May 22d. One movement from bowels this morning; slept well; tongue cleaning off at tip and sides and up centre; gurgling in right iliac fossa; no headache; drank two quarts of milk during the morning; four movements of bowels during the afternoon—liquid, ochre-colored, and bad-smelling. 7 P.M. Marked meteorismus; began Woodbridge's treatment, one No. 1 pill every fifteen minutes, each dose followed by two ounces of water, distilled or sterilized by boiling, or milk.

23d. Two liquid, ochre-colored stools during the day; meteorismus not so marked; tongue still coated, with red tip and edges; eruption still persists; thirty-four ounces of urine the past twenty-four hours.

24th. Large, soft, greenish movement with foam; No. 1 pills continued; six quarts of milk and three quarts of sterilized water taken during the last twenty-four hours; eruption fading; meteorismus less marked; slept well last night; watches the clock for time for pills; says if he had a good square meal thinks he would be all right.

25th. No movement of bowels for twenty-four hours (8 A.M. to 8 A.M.). No. 1 pills continued and No. 2 pills begun; two quarts of milk taken; eruption still persists; tongue still coated with a white fur, but clearing off slowly at tip, up the sides, and up the centre; meteorismus less marked; bowels moved at noon, giving a large, soft, yellowish movement.

26th. Last twenty-four hours drank four quarts of milk; at noon pills were suspended on account of complaint of sore-throat, the *azygos nvnlae* appearing much swollen, but no congestion or exudation observable in the throat. At this time had a large pea-soup-looking discharge from bowels. Ordered 130 grammes of quinine t. i. d. Tongue has still a white coating, except at tip, along the edges, and up the centre; pupils dilated; meteorismus gone. The eruption comes out most distinctly when the arms are kept under the blankets. One chopped-spinach stool in the evening.

27th. Back and abdomen and the body generally covered with roseolar spots of the size of a split pea. One thousand spots counted on the back alone. Two soft, yellowish green movements from the bowels.

28th. Ochre-colored fluid stool at 5 P.M.; pupils dilated.

29th. No movement of bowels.

30th. Appetite improving; milk-diet; pupils less dilated; soft, yellow motion from bowels.

31st. Spots well marked, but fading slowly; tongue cleaning slowly; pupils less dilated; at 7 P.M. glycerin enema; small, yellow action.

June 1st. Patient looks pale and thin in the face; temperature 98° F.; pulse 64; pupils dilated; tongue still coated; no movement of bowels.

2d. Looks emaciated and pale; gurgling still found in right iliac fossa; spots that were marked with ink several days ago still persist; a glycerin enema brought away an enormous soft, ochre-colored stool. He had no nose-bleed at any time.

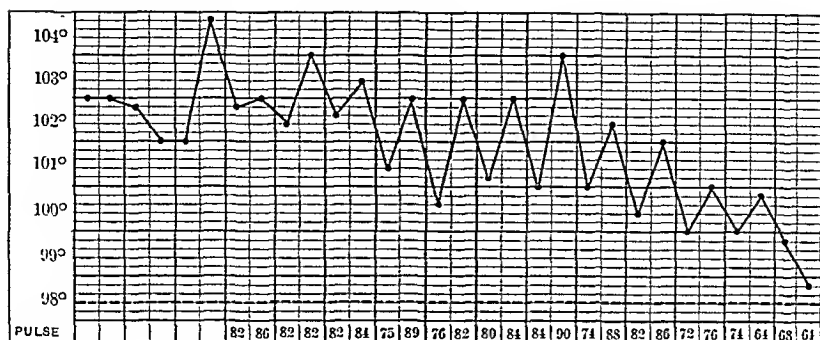
3d. Temperature normal; thin white coat on tongue; two soft, ochre-colored stools; pupils dilated.

4th. Glycerin enema, followed by a large, soft, ochre-colored stool; a stool of the same character on June 5th, 6th, and 7th.

8th. One large, well-formed, dark-colored stool.

9th. Tincture of digitalis ordered to be taken, 0.650 c.c., t. i. d.
15th. Returned to duty.

CHART 2.



REMARKS. I have noticed throughout my cases that the severity of the disease bore a close relation to the abundance of the eruption. In the case of Mrs. T. (a case that recovered, but not elsewhere referred to in this paper) the eruption was abundant all over the body, and the disease was severe, being complicated also with pneumonia of the right lung—the only one of my cases in which there has arisen any complication.

CASE III.—J. A. B., aged twenty-four years; American, private, Company F, Eighth Infantry, entered the hospital on May 26th.

Previous history. Had a sick spell about one week ago, with fever; took four purgative pills, which moved bowels three times; had headache; pains and aches in calves of legs and small of back.

Condition on entrance. Temperature $101\frac{1}{2}^{\circ}$ F., pulse 100; mental hebetude; very drowsy and somnolent; thick, white coat on tongue; took two laxative pills yesterday, which moved bowels once to-day; anorexia complete; "cannot eat anything at all;" slight pains in bowels in hypogastric region. No nose-bleed.

May 26th. Two movements from bowels through the night; ordered 0.0065 gramme podophyllum and 0.0065 gramme calomel every hour through the day. Three movements since noon of chopped-spinach character; powders stopped; patient somnolent all through the day; milk-diet. 7 P.M., a few small roseolar spots on front of chest and over scapulæ. The tongue looks as if it had had a coat of white paint except at tip and edges and up centre; gurgling in right iliac fossa, with slight tenderness.

27th. Numerous small, typical roseolar spots over scapulæ and some few over front of chest. Tongue looks as if it were daubed with white paint mixed with a little blue, with red tip and edges and a small, red arm of flame up the centre. 6 P.M., retention of urine for twenty-four hours; water drawn off with catheter; pupils dilated; no alvine evacuation; passed urine voluntarily later in the evening.

28th. Pupils contracted to normal; no medicine prescribed; milk ordered; evening temperature 99° F., pulse 74; tongue coated; pupils again dilated; urine had to be drawn.

29th. Temperature normal; tongue clean; spots persist that were inked three days ago; patient falls off to sleep at once after having his attention aroused. No movement of bowels after injection last night of 64 grammes of sweet oil and this morning of 4 grammes of glycerin; Seidlitz powder ordered; a dirty-yellow alvine dejection resulted; urine had to be drawn.

30th. Spots still persist; no movements of bowels; water drawn.

31st. Eight grammes of glycerin by rectum, causing the evacuation of a very large ochre-colored stool of medium consistency.

June 1st. Temperature normal; pulse 64; patient looks bright and says he feels strong. 7 P.M., passes urine voluntarily; temperature 98° F., pulse 60; one large ochre-colored stool at midnight.

2d. Eruption persists; tongue has a thin, white coating; one dark-colored stool.

3d. Temperature normal; eruption fading; thin, white coat on tongue.

4th. Glycerin enema, followed by a large, soft, ochre-colored stool.

5th. Tongue slightly coated; Seidlitz powder.

6th. Tongue slightly coated; enema of glycerin; no action of bowels; eruption faded; pupils contracted to normal.

8th. Well-formed, light pasty stool; eruption gone; tongue clean; tincture digitalis, 0.650 e.c., t. i. d., with wine tonic.

10th. Patient allowed to be up and around the ward. During the day patient began throwing off from stomach, and was sent back to bed.

11th. Tongue again coated; temperature raised; somnolent; stomach unsettled.

12th. Thin, brownish stool; tongue coated; gurgling elicited.

15th. Large, soft, ochre-colored stool. Tongue cleaning slowly.

17th. Convalescing.

CASE IV.—W. S., aged thirty-seven years; American, private, Company F, Eighth Infantry, admitted to the hospital at 4 P.M. on May 30th.

Previous history. Had felt badly for three days; legs ached till he could scarcely lie on his bunk; head ached; the "cords of his eyes" were sore; his limbs from his hips down felt very "sore" and ached wretchedly. Anorexia complete; had eaten nothing but a little bread with coffee and a little milk for three days. Had had small movement of bowels each day. On the morning of the day of admission the movement was loose.

On admission tongue was slightly coated; rest in bed and milk-diet ordered; at midnight had a loose, dark-colored motion.

May 31st. Gurgling in right iliac fossa; no tenderness; no spots on the skin. 7 P.M. tongue dry and glazed; glycerin enema: large, lead-colored action; later had a small, dark-colored, lumpy dejection.

June 1st. No movement of bowels; ejected solid curd from stomach; milk to be boiled hereafter and a little salt added; pupils slightly dilated; temperature 101 $\frac{2}{3}$ ° F., pulse 52. Thin, yellowish-white coat on tongue, inclining to dryness; no spots observable.

2d. Tongue dry and glazed with a thin, whitish coat. No spots have appeared; distinct gurgling in right iliac fossa; glycerin enema ordered; small, well-formed, yellowish-green movement; later, at 11 P.M., a large, dark-colored motion.

3d. Had a large, well-formed, yellowish movement, the stool appearing like candles or sticks of rolled sulphur; gurgling in right iliac fossa; no eruption observable throughout the case. 7 P.M., tongue has thin, white coat upon it.

14th. Patient has had several large, soft, well-formed motions (in shape and of color of rolls of sulphur) since the 4th instant. To-day patient was up and about the ward.

17th. Convalescing.

CASE VI.—J. F. S., aged twenty-four years; American, private, Company F, Eighth Infantry, admitted to the hospital on May 31st.

Previous history. Got up out of bed on the morning of May 30th feeling sleepy, with slight pain in left side; no headache; bowels moved twice the day before; rather constipated movements.

On entrance the tongue had a thin, whitish, glazed coat upon it; both sides of the body, from chest to knees, felt as if he "had walked about thirty miles;" gurgling in right iliac fossa; no eruption. 7 P.M., temperature 104° F., pulse 120; tongue dry and brown; sleeps continually; subsultus tendinum; 4 grammes of glycerin by enema; small, well-formed, black motion; later, a yellowish, watery dejection.

June 1st. Sleeps continually; fingers and hand twitch; two quarts of milk to be given within twenty-four hours; Woodbridge's pills No. 1 ordered given every fifteen minutes, each dose followed by 64 c.c. of boiled water or milk; four hours later patient vomited a quantity of greenish-yellow fluid. 8 P.M., water had to be drawn with catheter; gurgling in right iliac fossa; pupils dilated; no eruption.

2d. Tongue has a thick, white coat, but keeps moist; urine passed voluntarily; a few roseolar spots over right scapula; glycerin enema, followed by a liquid, dirty-brown movement.

3d. Large, brown, liquid stool at midnight; gurgling; tongue has a white coat.

4th. Thick, white coat on tongue, except tip and edges; glycerin enema; large, soft, clay-colored motion.

5th, 6th, and 8th. A soft, dark-brown motion.

10th. Tongue nearly or quite clean; patient allowed to be up and about the ward.

12th. Vomiting; inability to retain nourishment on the stomach; sent to bed.

13th. Tongue has a thick, white coat upon it.

14th. Coating of the tongue begins to peel off in flakes, leaving the surface red.

15th. Thin, yellow stool. Condition improving.

17th. Convalescing.

CASE VII.—D. S., aged twenty-six years; Irish, private, Company F, Eighth Infantry, admitted to the hospital on June 1st.

Previous history. Felt drowsy the day before admission; had one movement of bowels.

June 1st. No alvine evacuation; no gurgling detected; pupils moderately dilated; drank two quarts of beer to-day before admission.

2d. Thick, white coat on tongue; breath heavy and offensive; no gurgling detected; no eruption, except some spots of acne between the scapulae; no movements of bowels; ordered 0.003 gramme calomel every ten minutes for one hour, followed by Seidlitz powder. After a second Seidlitz powder the bowels moved at 4 P.M., the stool being

liquid, of a dirty-brown color, and containing a large quantity of fecal matter. Thin, white coat on tongue; gurgling in right iliac fossa elicited.

3d. Temperature normal; no roseolar eruption observable except perhaps one spot on front of chest, of rose color, papular, and disappearing on pressure. There are many spots of acne on the back. Tongue is still heavily coated and breath foul; pupils dilated; gurgling in right iliac fossa.

4th. Thin, white coat on tongue; breath heavy and foul; glycerin enema; no action.

5th. Glycerin enema; no action.

6th. Castor oil, 32 c.c.; large, well-formed, light-yellow movement.

15th. Returned to duty.

CASE VIII.—A. I., aged twelve years, first seen professionally on the evening of May 25th.

Previous history. On May 21st she became languid; her head felt "heavy, like she could not walk around with it," and she wanted all the time to lie down. No appetite since; no nose-bleed; the next day the left ear began to ache, and, finally, a day or two later, "broke and ran." On May 23d had oatmeal and soft-boiled egg; not retained on stomach.

May 24th. Bowels moved; no movement on the 25th or 26th of May, although laxative pills had been taken. Slept poorly on the night of May 24th, and had talkative delirium.

26th. Thin, white coat on tongue; one roseolar spot on right cheek; gurgling in right iliac fossa; no tenderness; pupils dilated; Woodbridge's pills No. 1 begun; milk-diet.

27th. Had headache last night; did not rest well; talked in her sleep; injection of soap and water into the bowels, which resulted later in a dark-colored, lumpy motion; one additional roseolar spot on right cheek; none on body. 7 P.M., pupils dilated; patient was hungry this afternoon and wanted potatoes. Woodbridge's pills No. 1 given throughout the day every fifteen minutes. "It looks like a chicken eating corn," remarked the good housewife and mother.

28th. The bowels moved early this morning, giving a soft, lead-colored motion; tongue cleaning, coat becoming thinner; two spots on right cheek still persist; two roseolar spots appear on right forearm and one on left. 5 P.M., small, greenish-yellow evacuation. Tongue cleaning off up the middle.

29th. Temperature 99° F., pulse 78; tongue still coated; pupils dilated. 6 P.M., temperature 98½°. Patient was found dressed and sitting up, contrary to my instructions.

30th. My admonition to the contrary, patient went to out-of-door Decoration Day services. Evening temperature normal.

CASE IX.—J. C., aged forty-nine years, Irish, hospital steward U. S. Army, returned from a six months' furlough, arriving in Lander (sixteen miles from post) on the morning of May 25th. Remained in Lander two days, during which time his bowels moved freely, about six times in each twenty-four hours. Rode sixteen miles by stage to his post on May 27th, and kept about his usual vocations until June 3d. On that morning, on rising, he felt a great deal of malaise and dull, shooting pains across his back and hips; could not bend forward on account of a severe lumbago; felt disinclined to do anything; had

four loose movements of the bowels during the day; no nose-bleed; never had typhoid fever. Gurgling in right iliac fossa; no eruption. Bread-and-milk diet.

June 4th. Woodbridge's pills No. 1 begun. In the afternoon the steward's tongue became covered with a whitish-blue coat; he feels very drowsy, and when he falls to sleep perspires profusely. Bowels moved twice during the night, the stools being thin and ochre-colored.

5th. Temperature slightly subnormal; skin cool and clammy; patient feels drowsy all the time; tongue heavily coated; pupils slightly contracted; soreness and pains from the level of the fourth rib to the feet, especially if limbs be moved, either extended or drawn up; pain and soreness chiefly in the quadriceps extensors, as after walking a great distance; two stools, fluid, yellow, and of chopped appearance; temperature normal, pulse 66; pupils contracted; no eruption has appeared. During the past twenty-four hours patient has taken sixty No. 1 pills; pills discontinued.

6th. Soreness through the hips and in the groins; tongue still coated; one large, well-formed, clay-colored fecal evacuation.

7th. Large, soft, ochre-colored motion; diet, milk and beef-broth; tincture iodine and carbolic acid, pure, each 0.200 c.c., in milk t. i. d.

8th. Large, soft, well-formed, dark-colored movement.

9th. Large, soft, well-formed, dark-colored stool; patient sat up to-day.

10th. Patient up and around to-day.

12th. Steward was returned to duty; solid food allowed tentatively. Convalescence was rapid and uninterrupted.

CASE X.—W. M., aged fourteen years, living on Big Wing River, was ploughing on May 26th, when his horses ran off, and while in pursuit he got heated up and got wet in the river. The next day he had headache; felt chilly sensations and flashes of heat over his body; head felt stopped up; tongue had a white coat; bowels constipated at first; salts were taken, then diarrhoea set in; eruption all over body, except face; first appearance on May 28th on the wrists; had high fever; was delirious, groaning in his sleep. Never had typhoid fever.

REMARKS. This case is typical of several that I have prescribed for at a distance, but which I have not seen.

My notes of the case are very meagre, being such as could be gathered from the messenger.

CASE XI. *Malarial intermittent fever.*—F. G. W., aged forty-one years, industrial teacher; came from Kentucky to this region seven months ago. The messenger gave the following history of the case:

Had been ailing for about a week, still keeping around at his duties, bones aching and chilly sensations. Got up two or three mornings ago and thought he would freeze to death, so got back into bed to get warm. The morning was that of an ordinary spring day. After laxative medicines his bowels began running off. To use the patient's own words, "there was a bushel of cold running from me." His face looks tanned, yellowish. Headache severe. Had a severe attack of typhoid fever three years ago, and came near dying. Lay in bed for a month, and was out of his head two weeks of that time. Says he now feels just like he did when he took down with typhoid.

REMARKS. This case was reported to me on May 30th, and, being on the lookout to find, if possible, a case of this eruptive (mountain) fever in a patient with an unmistakable previous history of an attack of typhoid, I took occasion to visit this case on the following day (May 31st) and found: tongue slightly coated; no gurgling in right iliac fossa; no tenderness; no eruption; bowels inclined to constipation; pupils normal; temperature and pulse normal. Within twenty-four hours the patient went about his work.

CASE XII.—D. A., aged twenty-three years; American.

June 4th had slight headache.

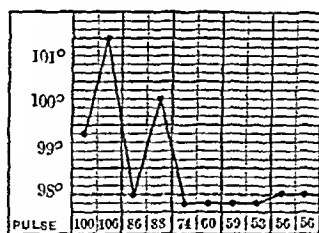
5th. Felt drowsy on getting up; stretchy; ate very little breakfast; has no appetite; very thin, white coat on tongue; threw up from his stomach at noon; eyes injected; pupils normal; gurgling in right iliac fossa; no eruption.

6th. Four evacuations of the bowels during the night, the motions being liquid, ochre-colored, and tinged with blood; four liquid, chopped-spinach stools during the day. A few roseolar spots between scapulæ; pupils dilated; gurgling and tenderness.

7th. Three liquid, ochre-colored stools.

8th. Temperature subnormal; pulse in the fifties; no movement of bowels; tongue still coated with a white fur; occasional perspirations with chilly sensations. Digitalis administered; patient up on the 10th; solid food used tentatively on the 13th; convalescence rapid; no relapse.

CHART 5.



REMARKS. The above histories of cases, with their temperature-charts and pulse-records appended, will afford a sufficiently clear clinical picture of the eruptive fever now endemic in this locality, but as to the essential nature of which the practising physicians in the vicinity differ in their opinions. For this reason and to the end that we might arrive at the true solution of the difficulty, I have requested my friends, Dr. F. Welty, agency physician, Shoshone Agency, Wyoming, and Dr. H. L. Callaway, county physician and city health officer, Lander, Fremont County, Wyoming, and other physicians of that city, to contribute a quota of cases of eruptive fever from their practice and express their opinion of the one or more varieties of these eruptive, febrile cases.

Dr. Callaway, under date of May 28th, writes me:

"I send you notes of sixteen cases. You will find that I have named all of them. Have not given you all of my cases (in May and June, 1894), as these were more simple."

He classifies them as follows: Four typhoid fever cases, four cases of purpura simplex, eight cases of purpura rheumatica (simplex).

Typhoid Cases.

CASE I.—B., female, aged nine years; taken sick June 18, 1892. Duration of fever twenty-eight days. Complete recovery by lysis.

CASE II.—S., male, aged twenty-three years; taken sick July 13, 1893. Duration of fever three weeks. Complete recovery by lysis.

CASE III.—H., male, aged twenty-six years; taken sick June 10, 1894. Duration of fever twenty-seven days. Complete recovery.

CASE IV.—L., male, aged twenty-eight years; taken sick December 28, 1894. Duration of fever twenty-eight days, with a relapse of twenty-six days. Complete recovery by lysis.

REMARKS. The above were typical cases of typhoid fever. Constipation in two cases; diarrhoea in two cases.

Purpura Simplex Cases.

CASE I.—E., male, aged thirty-eight years; taken sick June 12, 1894. Duration eighteen days. Complete recovery.

CASE II.—N., male, aged twenty-five years; taken sick June 18, 1894. Duration fourteen days. Complete recovery by lysis.

CASE III.—N., male, aged twenty-two years; taken sick June 28, 1894. Duration twelve days. Complete recovery by lysis.

CASE IV.—K., female, aged twenty-three years; taken sick July 2, 1894. Duration eighteen days. Complete recovery.

REMARKS. Constipation in all cases. Headache, malaise, anorexia, pains in back and in loins.

Purpura Rheumatica (Simplex) Cases.

CASE I.—C., female, aged nineteen years; duration eighteen days. Complete recovery by lysis.

CASE II.—P., female, aged six years; duration fourteen days. Complete recovery by lysis.

CASE III.—N., aged six and one-half years; duration twelve days. Complete recovery by lysis.

CASE IV.—N., male, aged thirty-five years; duration fourteen days. Patient was not in bed. Complete recovery.

CASE V.—G., female, aged thirteen years; duration twenty-four days. Complete recovery.

CASE VI.—N., female, aged twelve years; duration twelve days. Complete recovery.

CASE VII.—S., female, aged thirteen years; duration thirteen days. Complete recovery.

CASE VIII.—E., male, aged forty-two years; duration sixteen days. Symptoms. Malaise, anorexia, debility, headache, pain in back and

limbs, constipation, pulse 100 to 118, temperature 100° to 103° F. for two to five days, then pains in joints, ankles, knees, elbows, wrists, and finger-joints; also some swelling in joints when fever is at its height.

Eruption appears *first* over joints that are swollen and painful, then over entire body save face. Eruption lasts from three to five days. Temperature drops to almost normal during the eruption. When the eruption disappears the temperature goes up to 102° or 103° F. for one or two days, then gradually falls to normal, and complete recovery follows.

Treatment. Aromatic sulphuric acid, quinine, sodium salicylate, and phenacetine.

Dr. Callaway also remarks that the cases he had last fall are not the same he had this spring. Last fall there was no pain nor swelling in the joints. This spring there was fever for three or four days (101° to $104\frac{1}{2}^{\circ}$ F.). On the fifth day after I saw the cases an eruption appeared, papular, rose-colored, discrete; disappeared on pressure; lasted three, four, five, or seven days. During the eruption the temperature dropped to $101\frac{1}{2}^{\circ}$ F. in the afternoon; then on disappearance of the eruption in two cases the temperature rose to $102\frac{1}{2}^{\circ}$ F. for two days; then rapid defervescence of the fever and convalescence.

Pains and swelling in joints, especially in knee and elbow, and less frequently in ankle, wrist, and joints of the fingers.

Patient starts in feeling bad, slight nausea and dull headache, pain in back and constipation. These were symptoms occurring previous to my first visit. There was constipation in all cases except one, in which there was diarrhœa.

Treatment. Laxative, calomel, one-eighth grain, and sodium bicarbonate, 2 grains every two hours until bowels moved freely, then Rochelle salts as required. Color of stools not noted. Tongue had whitish coat, thick and flabby, with red tip; anorexia, loss of flesh, weakness.

Dr. P. Welty, physician to the Shoshone and Arapahoe tribes of Indians, whose reservation surrounds the military reserve of Fort Washakie, has given me a numerical summary of cases of eruptive fevers among these Indians and the percentage of mortality. His cases among the Shoshones aggregate eighteen, with a mortality per cent. of $16\frac{2}{3}$, and among the Arapahoes twenty-five, with a mortality per cent. of 20.

The following case which I saw with Dr. Welty on one occasion will serve as an example of the general run of these eruptive fevers among the Indians:

Wallowing Bull, a large, muscular Arapahoe, aged about forty-eight years, was seen on May 23, 1895. Four days previously had felt "hot and cold;" has had headache and vomiting. One loose passage from the bowels each day; a dark-colored liquid stool was noticed on the hillside. These movements had followed the administration of laxatives. On May 23d (the day of observation) the temperature was $102\frac{1}{2}^{\circ}$ F., pulse 85; gurgling elicited in right iliac fossa; rose-colored papular eruption over body and extremities; tongue coated with a moist, whitish fur, with red tip; tremulous when protruded; small maculæ on roof of hard palate.

When this case was seen two weeks later by Dr. Welty, the following symptoms were noted: Tongue clean, appetite good; bronchitis, with profuse expectoration of white, frothy mucus, not blood-stained; skin mottled as if bruised, some of the petechiæ being as large as a silver quarter; pulse 65; sore and stiff in feet; no swelling of ankle or other joints; constipation, Epsom salts being asked for.

In the mean time another case had developed in an adjoining tepee:

Yellow Calf's squaw, aged twenty-five years, who presented gurgling in the right iliac fossa; no tenderness; constipation; white, moist fur on tongue, that organ being tremulous when protruded; voice shaky; eruption well marked, papular, and rose-colored; pain in the back of neck, loins, thighs, and legs.

This disease attacked Indians of all ages from the papoose at the breast to the sexagenarian. The following numerical classification of the cases, according to ages, is significant: One case occurring in infancy, seven between two and ten years, twenty-four between ten and thirty years, eleven above thirty years.

Two of the fatal cases ere as follows:

CASE I.—Tashiquata, squaw, aged about twenty years, died June 12, 1893. This squaw had been sick about three weeks when I saw the case with Dr. Welty, the day previous to her death. She presented a deplorable picture; her body covered with blotches caused by extravasations of blood into the areolar tissue; her hard palate and mucous membrane of the mouth presented abundant petechiæ; blood escaped from the nose and mouth, and bloody, liquid, involuntary discharges from the bowels; rapid breathing of a panting character; mucous râles over the chest; tumefaction of the abdomen; pulse rapid and weak; pupils dilated; putrefactive changes setting in almost ante mortem; autopsy impracticable.

CASE II.—Zego's child, aged eighteen months, nursing; sick between three and four weeks; temperature (May 14, 1895, when I saw the case in Dr. Welty's absence) 102° F., pulse too rapid to count—a running pulse. The right cheeks, thighs, and buttocks were the seats of hemorrhagic purpura, the skin being stiff and hard, of leathery consistence, or resembling heavy parchment paper, crumpled in places and raised above the underlying tissues, being, in fact, one dark purple mass of hemorrhagic extravasation. Petechiæ abundant over the hard palate and over the entire cutaneous surface of the body. Respiration fitful to the minute. Child died May 18, 1895. Autopsy impracticable.

The usual history of these eruptive cases among the Indians, as given me by Dr. Welty, is a fever of two, three, or four weeks' duration, attended by a rose-colored eruption, frequently associated with macula or petechial spots or patches; tendency to constipation; later the bowels move without laxatives; white coat on tongue, with red tip and edges; tongue tremulous when protruded; pulse not always in rhythm with the temperature; loss of flesh; debility; convalescence slow.

Dr. Welty remarks:

“I consider these cases a purpura simplex, rheumatica, and hemorrhagica. The simplex cases are those in which the rose-colored papule are the chief feature in the clinical history. The rheumatic cases are

those in which pains in the joints are associated with the eruption. The hemorrhagic cases are those in which petechiæ or purpuric spots are present."

REMARKS AND CONCLUSIONS. It is a matter of great practical importance to the health and welfare of this community that its sanitary officers—the health officer of the city of Lander, the agency physician to the Shoshone and Arapahoe tribes, and the post surgeon of Fort Washakie—should seek to determine whether these endemic eruptive fevers (apparently so dissimilar among themselves and so at variance in their clinical features with the descriptions of typical cases of fever in our text-books) are essentially one and the same disease or entity, and if so whether that disease be typhoid fever—a preventable and well-recognized disease in its semeiology, pathology, symptomatology, and treatment—or whether these eruptive cases belong nosologically or etiologically to two or more distinct classes of diseases, as typhoid and purpura, the latter of which we know little regarding its causation, prevention, or cure. When we regard the usual fatality of typhoid fever from 5 to 15 per cent. and more, it is not a little surprising and perplexing that among forty or more cases of these eruptive fevers occurring among the whites in this vicinity—not one-fourth of which cases were regarded as typhoid fever, and got well in spite of the treatment—the mortality should be *nil*.

It certainly argues (admitting the cases to have been typhoid) a lessened fatality of that disease in mountain regions. Recognizing the fact, however, as admitted by all clinicians, that no fever is more variable in its manifestations than typhoid, we must not regard the presence of any one symptom or sign, however "pathognomonic," as essential to the diagnosis of this disease.

In one case the eruption may be wanting; in another the typical temperature-curve or the initial diarrhœa, epistaxis, ochre-colored stools, or even the gurgling in the iliac fossa found so constantly in this disease; or there may be present almost obstipation, reduction of the pulse-rate, amounting to bradycardia, ecchymoses into the skin and areolar tissue, as seen in purpura hæmorrhagica; a remittent type of pyrexia, as seen in infantile remittent fever; a course of short duration, as though abortive, and of an ambulatory character.

Convinced in my own mind of the identity of these eruptive fevers (whether the eruption be papular or macular) with typical enteric fever of the authors, I called the attention of the commanding officer in my sanitary report for the month of May, 1895, to the prevalence of this fever, to its mode of propagation, and to the measures requisite for its prevention.

The following is an extract from that report, with the indorsement of the commanding officer thereon:

"Several cases of mountain fever, which in my opinion is typhoid fever, have appeared among the enlisted men and children of the garrison. This is a preventable disease, and should not spread epidemically. The remedy lies chiefly in protection of our water-supply from contamination with the infectious stools of typhoid cases; and inasmuch as this disease is among the Indians, and our water-supply may become infected by cases living in tepees along the South Fork (one case having already occurred along that stream), it is advisable as a precautionary, preventive measure that the Indian agent be requested to remove, temporarily at least, all tepees situated along the South Fork I believe it would be perfectly practicable, if the Chamberland filter could be utilized, to furnish water perfectly free from disease germs to all members of this command, and under military restrictions to prevent the drinking of other waters until within a short time (the Indians being removed from along South Fork) that stream would purify itself, and this fever would disappear from the garrison. It is recommended under the circumstances that water be boiled in the barrack quarters and put in a clean cask and cooled with ice, if necessary, and used by the enlisted men as drinking-water exclusive of any other."

Indorsement. A letter, copy herewith enclosed, has been sent to the acting Indian agent, requesting him to remove all tepees from the banks of the South Fork:

"A circular has been issued directing the commanding officer, Company F, Eighth Infantry, to have all the drinking-water used in his company boiled before the men are allowed to drink it, and recommending that officers, their families, the families of enlisted men and civilian employes, take the same precaution with regard to their drinking-water."

The exclusive use of water sterilized by boiling for potable purposes by the members of this garrison was begun on the afternoon of May 31st; and it is a significant fact that no further cases developed later than four days subsequent to the use of boiled water for drinking purposes, when we consider that the shortest probable incubative stage of typhoid fever is seven days, and its usual incubative period is from ten to twenty-one days.

In none of the eruptive cases recited in this paper did herpes labialis occur; in none was there a history of a previous attack of typhoid fever, and yet in this vicinity there are a number of individuals who have had typhoid fever in the East and elsewhere, and were exposed to the same influence under which others succumbed to this mountain fever.

The four cases that occurred in April and were provisionally diagnosed malarial remittent fevers I am now inclined to regard as genuine typhoid cases, and the subsequent attack of Fabianski's, as recorded on thermometric chart No. 2, and setting in about ten days after subsidence of the primary attack, might consistently be regarded as a relapse.

One of the most striking features in these cases, as indicated on the charts, is the bradycardia or slowness of the pulse-rate. This is not

uncommon in the course of continued fevers, and is usually regarded as an indication of exhaustion of the cardiac muscle, but bradycardia was noticeable very early in these fevers, and certainly before any degeneration of the heart-muscle could take place through changes incident to hyperpyrexia or prolonged pyrexia, and it will be observed in Parker's case (chart No. 4) that the temperature seldom rose above 99° F., and yet bradycardia was well marked, while there was hardly any apparent loss of muscular strength or wasting of the body tissues; and again, in the case of Dave Adams (chart No. 5) the pulse on the evening of June 8th registered fifty-two beats to the minute, and yet four days previously he was sufficiently active and strong to rope and throw a young broncho for the purpose of having the horse's eye operated. In the mean time he had had two days of moderate remittent fever and two of slightly subnormal temperature.

All these slow pulses are regular, soft, and full, and show no tendency to dicrotism. Digitalis was the remedy par excellence in bringing these pulses up to the normal.

While the mortality among the whites has been *nil*, that among the Indians has been, what might be expected in typhoid cases among them, attended pretty generally with purpuric spots, viz., 18.6 per cent.

The Indian's "sick ration" consists of bacon, coffee, and sugar, which are not conducive to the soothing of ulcerated patches of intestine, and are, therefore, better withheld in this disease if a dietary better suited to the condition could be procured.

The purpuric spots accompanying this disease among the Indians in many cases are probably due to some dyscrasia of the blood induced by a too restricted and unvaried dietary and unhygienic surroundings.

Their cases have been regarded and treated as purpura, as also twelve out of the sixteen cases kindly furnished me for this report by my friend, Dr. Callaway; and while I regard all these cases as typhoid fever, the lack of unanimity in our opinions upon the matter only serves to emphasize the wide divergence of these fevers in their clinical manifestations from those features commonly met with in typical cases of typhoid fever. The practical import of a correct diagnosis cannot be lost sight of. If these cases are typhoid, the old adage of "an ounce of prevention" is eminently applicable. If they be cases of purpura or of fever *sui generis* in their nature and unknown to the profession at large, the *onus probandi* lies with those who so declare.

THE NATURE AND TREATMENT OF SPASMODIC TORTICOLLIS.

BY G. L. WALTON, M.D.,
OF BOSTON.

SPASMODIC torticollis is a disorder of the cortical centres for rotation of the head.

Suppositions pointing to peripheral, spinal, and bulbar disturbance may be dismissed with passing notice. The nerves are found normal. The theory of Tilleau, assuming lack of balance in the cervical muscles, as well as that of Chareot, assuming hypertrophy of certain muscles through atrophy of others, hardly reaches the real seat of disturbance, as De Quervain comments, for we have still to explain the origin of the lack of balance and the muscular atrophy. The theory of Chareot lacks also clinical confirmation.

Nuclear origin may be at once eliminated when we remember the wide distribution of the areas on different sides and in different segments of the cord which must be associated to produce the typical case of spasmodic torticollis.

In the cortex alone are these movements intimately associated in the so-called centres for rotation of the head.

The nature of the disturbance is not so readily determined as its seat. Indeed, the pathogeny of associated spasm in general offers, as so profound a student as Erb affirms, one of the most complicated problems in neurology.

Brissaud apparently deems rotatory tie a mere mental phenomenon—the result of an irresistible impulse. In support of this view he adduces the fact that the simplest movement of the patient, *e. g.*, putting the finger to the chin, may sometimes check a spasm so severe as to resist the most forcible opposition from another person. A voluntary has here inhibited an involuntary movement, the result of a psychomotor hallucination. It is, however, true that a sneeze may be inhibited by passing the finger lightly upon certain points about the nose, but it does not follow that a sneeze is a purely mental phenomenon. Psychological or physical, the impulse is beyond the voluntary control of the sufferer, and the patient presenting the most marked case of easily inhibited spasm which has come under my observation resorted eagerly to most extensive operation upon muscles and nerves in the hope of relief.

Patients suffering from this malady, though generally of neuropathic make-up, are not especially prone to present the mental peculiarities or other stigmata of hysteria. My experience does not show the association with epilepsy mentioned by certain authors.

The proposition that gross organic lesion, such as is occasionally found

in facial tic, is present with any frequency in spasmodic torticollis is hardly to be seriously considered, though it is by no means improbable that in the affected areas of the cortex a certain degree of cytolysis is present. In fact, in view of Van Giessen's recent communication, the possibility of a selective autotoxin must be borne in mind in this affection, as in tetany. One case, indeed, has been directly traced to malarial poisoning, and has succumbed to the use of quinine (Simon).

Whatever the exact pathogeny of the process, it would seem that long-continued habit may finally merge into spasm, as in the case of the patient (cited by Gowers) who, for twenty years, had nodded violently in conversation. Closely allied is the overuse of certain muscles of the neck, as illustrated by the weaver who had constantly to rotate the head rapidly at her work (Annandale).

Neurotic heredity certainly predisposes to this malady, and the usual causes of neurasthenia—overwork, anxiety, and depressing emotions—favor its inception. The sufferers are rarely robust. De Quervain cites the case of a person who for some time held the head in one position on account of a furuncle on the neck, and argues that the long-continued overuse of the centres of rotation produced here an irritability which caused continuance of the movement. The furuncle itself would certainly point to a debilitated condition which might well decrease the power of inhibition.

Performers on musical instruments have become subject to spasmodic torticollis, doubtless from overuse of certain muscles.

Among the commonest causes for malpositions of the head the most worthy of attention is ocular defect, whether from refractive error or muscular insufficiency. This variety of irritation as a mere reflex source of spasm has been curiously overlooked in discussions not only of torticollis, but of facial tic, which begins almost invariably in the lid, and has always seemed to me primarily an involuntary effort to close the eye, the spasm extending later to the other facial muscles.

Leaving to one side, however, the question of reflex excitant, we cannot overlook the fact that oblique astigmatism and muscular insufficiencies are particularly prone to cause a *habit* of tilting the head to one side or the other, thus producing the lack of balance of Tilleau and the excessive movements of De Quervain and others.

Not only is this supposition reasonable from an *à priori* point of view, but facts tend to bear out the conclusion that ocular defect may be, in certain cases at least, the exciting cause of spasmodic torticollis in neuropathic individuals.

The fact that this spasm, like facial tic, writer's cramp, and allied neuroses, disappears during sleep, would certainly indicate that the central irritability is connected with some effort of the waking hours, of which use of the eyes is among the most constant.

The age of onset, generally from thirty to forty years, is curiously suggestive in that this is the age of greatest accommodative effort.

A noteworthy case is that noted by Dr. Chandler: A patient with oblique astigmatism was given by mistake a plus spherical glass with minus cylindrical element added in place of plus cylindrical, thus increasing his astigmatic error. After wearing the glass for about five years a spasmodic torticollis was established of sufficient severity to require operation.

Relief of malposition and of incipient torticollis has been noted by oculists. This branch has not yet been studied sufficiently to enable us to formulate an absolute opinion, but is worthy of consideration in view of its practical bearing on the early correction of refractive errors.

In any event, torticollis once fully established cannot be cured by correcting such errors.

COURSE. The course of the fully developed disease is most melancholy; more and more muscles become involved, pain sometimes most severe ensues, the patient becomes unable to take part in any occupation or to take any pleasure in life.

MUSCLES AFFECTED. The muscles most commonly affected are the sterno-mastoid, the trapezius, the splenius capitis, the complexus, the trachelo-mastoid, and the inferior oblique. In the majority of cases the spasm attacks the sterno-mastoid of one side and the posterior rotators of the other, these muscles all combining to rotate the head in the same direction, the head being meantime tilted rather backward than forward on account of the greater power of the posterior group. In a small proportion of cases the sterno-mastoid alone is affected. In a still smaller proportion of cases the sterno-mastoid and posterior rotators of the same side are involved, the head being tilted without rotation toward the affected side. An occasional case is met with in which the posterior muscles on both sides are affected, the head being drawn directly backward (retrocollis). Rarely both sterno-mastoids alone are affected. In an occasional case these typical positions are varied somewhat, as, for example, by implication of the platysma myoides, the chin being drawn down on the affected side.

TREATMENT. The treatment of this distressing affection by drugs, as demonstrated by Nohle Smith some years ago, has proved absolutely ineffectual. Electricity has accomplished nothing, and mechanical support, occasionally furnishing some relief, especially in recent cases, is, as a rule, intolerable. Correction of refraction in advanced cases accomplishes little or nothing. The continued rest cure has proved unsatisfactory in the only case coming under my observation. Persistent massage seems to have been useful in certain cases; it should be tried before resorting to operation, unless the case is so well advanced and distressing that further delay seems an injustice to the patient; it

should be used also in those cases in which the patient objects to an operation.

OPERATIVE TREATMENT. Coming to the question of operation, simple section and stretching of the nerves have proved of too temporary relief to justify the postponement of more radical measures. The only operations to be seriously considered are resection of the nerves and section of the muscles.

In an occasional case resection of the spinal accessory nerve will accomplish a cure, even though the spasm has extended beyond the muscles supplied by this nerve. In the vast majority of cases, however, the opposite result will obtain, and the spasm will afterward extend to the posterior muscles, even though it was at first limited to the sterno-mastoid. It is in all cases wise to perform this operation first, and perhaps to perform section of the sterno-mastoid, partly in the hope that the case may be one of the exceptionally favorable, and partly because it is well to divide the operation in case the sterno-mastoid is affected on one side, and the posterior rotators on the other. In an exceptional case, in which the sterno-mastoid and posterior rotators are affected on the same side, it will be found wise to perform the whole operation at once, as was done by Dr. Richardson in an intractable case of this variety, in which perfect and permanent cure has followed section of all the muscles, together with resection of the spinal accessory nerve and the posterior branches of the three first cervical nerves.

Before recovery can be expected it will be necessary, in the majority of cases, to resect at least the spinal accessory nerve on one side, and the posterior branches of the three first spinal nerves (an operation in which Keen was a pioneer) on the other. It will be wise in the majority of cases to cut the affected muscles also.

Cutting the affected muscles alone, as practised by Koehler, seems to give a good percentage of recovery after such operations (seven in twelve); the muscles to be cut, if we follow his plan, are the sterno-mastoid, trapezius, complexus major, complexus minor (trachelo-mastoid), and obliquus inferior. According to the theory of De Quervain, this operation acts upon the cerebral centres for rotation in a suggestive way; in other words, spasmodic rotation having been prevented for a certain length of time by the operation, it does not recur after operation, perhaps in part because the muscles have been weakened, but more particularly through so-called suggestion to the central nervous system. It is hard to see why muscle-section should impress a more vivid suggestion upon the centres of rotation than nerve-section, and after the latter operation spasm almost invariably recurs. It certainly seems safer, in case muscle-section is performed, to resect also the nerves supplying those muscles. This combination has been accepted and practised to a certain extent by Richardson.

PROGNOSIS. As regards the hope of recovery, most patient and persistent effort will be required, both of the patient and the surgeon, a number of operations being necessary in the average case before such recovery can be effected. Even then we can hardly expect an absolute cure in much over 50 per cent., amelioration in a somewhat greater number, while absolute failure will have to be recorded in a certain proportion; absolute failure will generally be largely attributable to lack of perseverance. It is a question if we have not erred up to this point in the direction of conservatism, and it is not improbable that the time will come when it will be considered advisable in the most intractable and distressing of these cases to remove all the muscles which Koehler has mentioned on *both* sides, and to cut both spinal accessory nerves as well as the posterior nerve-roots on both sides. The experience of Gardiner shows that the head can still be held upright after removing all these nerves, at least, and even if it could not, this affection in its most obstinate and distressing form renders the sufferer so valueless and miserable that he would even choose complete inability to hold up the head, requiring the use of a collar, in preference to remaining in his present condition. I have myself put this question to several patients and received this reply.

With regard to the muscles which maintain the position of the head and carry on the movements after operation, it would seem that the head is flexed by the anterior recti, rotated by the anterior and posterior recti, and tilted by the lateral recti and superior oblique. As regards retroflexion of the head, the posterior recti, if spared, are able to accomplish this movement, as De Quervain has pointed out, after muscle-section. It is a little harder to see what muscles retroflex the head after the posterior branch of the first cervical nerve has been removed, thereby paralyzing these muscles. It seems not impossible that the lateral recti succeed in performing this movement through their insertion into the jugular processes, which are situated somewhat posteriorly to the axis of motion, the muscles running back to this point from their origin at the anterior edge of the lateral processes of the atlas. They are not credited with this action in any anatomy I have consulted, so that this suggestion is offered with considerable hesitation, especially considering the poor leverage possessed by these muscles.

Great as the progress already made toward the relief of this most distressing and obstinate affection, the subject has by no means been exhausted, and accurate reports of operations and results are desirable. Sufficient material has, however, been accumulated to establish the fact that it is in the direction of operation that the most definite results are to be expected in well-established cases, and we are justified in the expectation that the percentage of cures may be materially increased by persistent effort.

INFANTILE MYXŒDEMA.

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THE doctrine which teaches us the value to the economy of the secretions of the ductless glands is comparatively recent; but from it we have already learned that organs like the thyroid and adrenals, hitherto almost overlooked, subserve physiological functions of great importance. Among the many great achievements of this great century may surely be ranked the benefits which humanity has already received from the recognition of this doctrine. The case reported is a living exemplification of this wonderful discovery—the principle known as *organotherapy*. This paper professedly deals only with infantile myxœdema, but reference to the adult and allied forms cannot be avoided. We recognize a congenital and, if you will, an acquired type of the infantile variety. The former are all born with absent or atrophied thyroids—not developed. They present marked symptoms *at birth*, including peculiar shape of head, premature ossification of the basi-sphenoidal juncture, to which Virchow called attention, imbecility, etc. Horsley also describes an intermediate form, the symptoms of which develop *shortly* after birth; the child is able to live, and a goitre is usually present—*i. e., all thyroid tissue is not destroyed*. The most interesting types, however, are the sporadic, to which my case belongs, and the endemic. These children seem perfectly normal at birth and for some time thereafter, when suddenly, at about the age of six months (rarely before this), as in my case, one, two, three, or four years, or even later, the disease becomes manifest. Cases are considered sporadic which occur between the ages of six months and puberty.

ETIOLOGY. Heredity, pregnancy, consanguinity, alcoholism (especially drunkenness at the time of the procreative act), syphilis, water, climate, soil, etc., have all been considered as predisposing causes. As for my case, none of these were operative. The parents are in no wise related; were total strangers before marriage; nor does either come from a locality (both are foreign-born) where cretinism is endemic. *No history of goitre* can be elicited in either parental line. Alcoholism and syphilis can be definitely excluded. The child was born in this city, and though our water and soil may be responsible for other diseases, I am not aware that they produce cretinism. We know very little as to predisposing causes. One curious fact is that healthy children sometimes become cretinous if they move into a section where cretinism is endemic. Fagge long ago resolved that heredity was an important factor, and said that when both parents were goitrous, cretinism was very apt to follow in the second or third generation.

The history of this affection is so intimately interwoven with that of the adult variety, and finds such detailed description elsewhere, that I shall but barely allude to it. Only gradually did the evidence accumulate which proved that myxœdema was but a symptom which always accompanied the cretinoid state, whether it occurred in childhood or in adult life. Even the name myxœdema is probably not well grounded. In 1873 Sir William Gull commented, for the first time (*Transactions Clinical Society, London*), upon a cretinoid state supervening in adult life in women, but offered no explanations thereof. Ord in 1877 published a paper (*Transactions Royal Medical and Chirurgical Society, London*), in which he reported five cases similar to Sir William Gull's, and for which, because the chemical examination of the œdematous subcutaneous tissue revealed an excess of mucin, he proposed the name of myxœdema. The theory advanced by Ord, in explanation, was rather ingenious if not adequate. "Certain substances which normally are not formed, or, if formed, are as rapidly absorbed, are no longer disposed of, but accumulate in the skin. Not only are the sweat-glands rendered inactive by this mechanical hinderance, but all eliminative cutaneous function is in abeyance. The terminal nerve filaments being embedded in this new material, peripheral stimuli are no longer conducted to the cortical centres; these stimuli, wanting these centres, become inactive; a sort of atrophy from disuse follows." Thus Ord accounts for the hebétude and psychical torpor and for the general lowered metabolism.

Surgery involuntarily contributed, by a boldness which after experience proved a blunder, much valuable information to the etiology of this subject. Reverdin was the first to describe the cachexia strumipriva or thyreopriva—as Horsley suggests—*i. e.*, the peculiar cachexia and imbecility which were observed after removal of the thyroid gland for various reasons. Kocher in 1883 also described this alarming operative sequel. It was reserved for Semon, however, basing his reasoning upon deductions from Horsley's animal experiments in conjunction with the condition observed in man after surgical removal of the thyroid gland, to suggest that it was the *loss of this organ* which was always responsible for the myxœdema. The identity of infantile and adult myxœdema was asserted in 1888 by the committee of the Clinical Society of London in their elaborate and exhaustive report on myxœdema, from which I quote as follows: "That there is strong evidence that myxœdema, sporadic cretinism, endemic cretinism, cachexia strumipriva, and operative myxœdema of animals are, severally, species of one genus, and that such clinical differences as exist between them are due to causes already sufficiently set forth, and that the one pathological factor common to all these conditions is the occurrence of morbid processes or of operations involving the annihilation of function of the thyroid body." In this storehouse of information

are also found the results of Horsley's experiments on animals, which went so far to prove the importance of the thyroid to the economy. Animal experiments since performed by many, among others Gley and Murray, confirm all the earlier claims. In animals, as in man, when myxœdema does not follow operations, it is either because some thyroid tissue has been left behind capable of enough subsequent growth to properly represent thyroid function, or accessory thyroids were present, as is almost the rule in animals. Negative results are due to many causes, such as lack of care, sepsis, and especially exposure to cold, for the myxœdematous animal, like the myxœdematous human, *cannot endure the cold*. These cases always improve somewhat in summer and get worse in winter.

Whatever may be the nature of the predisposing cause, in discussing the pathogenesis of infantile and adult myxœdema and their congeners, our entire attention may be focussed on one organ alone—the thyroid gland. There is hardly need to recount the evidence going to prove that upon absence of this organ, or upon some disturbance in its function, the whole pathological superstructure rests secure. In cases of congenital cretinism the gland is not developed or is atrophied, and, as in many cases no trace of thyroid tissue has been found, it is very probable that sporadic cretinism, too, depends upon atrophy or, to put it still stronger, upon absence of this body. Of endemic cretins it may be said that two-thirds *are* goitrous, and of the remaining third that there is kinship with some goitrous, even though non-cretinous, person (Curling, 1850). In other words, the thyroid gland may be present, but its presence *by no means indicates that its secretion is healthy*. Any change, therefore, in the thyroid secretion which produces an alteration quantitatively (in the sense of diminution), or qualitatively in the sense of a departure from the normal physiological standard, probably *in the direction of lowered potency*, is apt to be followed by conditions of which cretinism is one expression and myxœdema another. Absence or atrophy of the gland, interstitial inflammation with subsequent destruction of secreting structure, cystic degeneration, as also operative removal in man or experimental ablation in animals, may all be followed by the diseases before described.

Our knowledge soon finds a barrier beyond which at present we cannot pass when we attempt to account for the marvellous influence of this little body. Of its real function nothing positive is known. By some the gland is associated with hæmatopoiesis. Horsley observed marked anæmia after ablation in dogs and cats. He does not claim, however, that the anæmia is the direct result of the ablation, nor would this claim, in my opinion, deserve defence. Depraved nutrition and lowered metabolism are nowhere better shown than in myxœdema, and malnutrition and anæmia are too often coexistent elsewhere to excite partic-

ular comment. One thing is positive: none of the internal secretions, the seminal fluid excepted, rank the thyroid in potency. The changes produced in this little dwarf, both before and after the administration of the extract, sufficiently demonstrate this statement. Growth, the vegetative functions, locomotion, reproduction (for eretins, as a rule, are sexually impotent), and those faculties which raise man above the brute—thought, speech, and intellect—are all profoundly influenced in a detrimental sense if this secretion be lacking. More wonderful still, if the absent thyroid material be supplied, we, in varying measure, counteract this malevolent condition and accomplish miracles that do *not* lack proof.

Probably the material furnished by the gland is an absolutely essential one, and all that we need to do is to supply this absent secretion from another source. Mendel thinks (*Deutsch med. Wochenschrift*, 1895, p. 101) that it may be the function of the gland to secrete a substance which, when present, prevents the formation of, or neutralizes, if formed, certain toxic substances. If the thyroid material be wanting, these hypothetical toxins accumulate and excite the symptoms already named. The administration of thyroid extract acts as does the natural juice, and can prevent such poisoning. I shall refer presently to the latest hypothesis in this connection.

Thus far we have been studying the effect of absence or diminution of thyroid juice, or of its loss in functional power, and have seen the resulting clinical picture. In the last few years we have begun to believe that we can have abnormal states dependent not only upon the foregoing, but upon *increased activity or altered quality* as well.

Upon the set of symptoms which supervene when thyroid extract is given has been conferred the name of *thyroidism*. The description of the symptom-complex which followed its administration in my case is almost typical for all the cases. Briefly, this symptom-group is composed of insomnia, restlessness, warmth of skin, tendency to perspiration, accelerated heart-action, mental excitability, quickened intellection, muscular twitchings, tremor, etc.

This picture has many features common to the physiognomy of that very enigmatic affection—Graves's disease. In speaking of Graves's disease I allude only to typical cases, not to the cases of so-called surgical Graves, nor to those known as pseudo-Graves, nor to the well-defined *formes frustes*, cases which are more or less temporary.

Graves's disease, when it merits the name, is always accompanied by some change in the thyroid gland. Because of this constant implication of the thyroid in Basedow's disease, because of the marked resemblance between thyroidism and the symptoms of exophthalmic goitre, as well as on account of certain evidence of an histological and physiological nature, a most interesting theory has been advanced. This theory desires

to maintain that two distinct diseases may be brought into direct pathogenetic relationship with changes in the thyroid gland. If the secretion have suffered diminution in any sense, we have learned to expect myxœdema or cretinism; but if the amount of thyroid material poured into the blood be in excess, or, if not in excess, such alteration in quality has occurred as shall be equivalent to *an increase in functional activity*, then exophthalmic goitre will be produced. This is the so-called thyroïdal theory of Graves's disease. Moebius, one of its most ardent advocates (*Zeitsch. f. Nervenh.*, 1891), thus contrasts the latter with myxœdema and cretinism: "In the one case we have enlargement, in the other diminution in size of the thyroid; here the pulse is rapid, there slow; the skin fine, warmer than usual, and inclined to sweat, instead of thick, cold, and dry; on the one hand, excitability, increased mental irritability, irritable weakness; on the other, slowness and dulness of mind."

Myxœdema and cretinism and exophthalmic goitre are, therefore, antithetic affections; in the former, there is what has been termed an *athyroidation*, in the latter a *hyperthyroidation* of the system. As for the pathogenesis of myxœdema and cretinism, that I consider fully established, but cannot consider myself as thoroughly converted to the thyroïdal theory of Graves's disease, although there is very much to be said in its favor. In the first instance, the literature records excellently attested cases, among others three by Baldwin (*Lancet*, January 7, 1896), where exophthalmic goitre has been present for some time, and has *gradually been replaced by myxœdema*, the assumption being that first there was increased activity in thyroid function—*hyperthyroidation*. The gland then gradually underwent interstitial changes, with progressive loss of secreting tissue until from insufficiency of thyroid juice *athyroidation* ensued. Graves's disease has also come on in cases of cystic goitre more or less slowly, and has, after a long time, given place to a myxœdema. Immediately after thyroidectomy, or exothyropexy, when the glairy colloid material has exuded into the surrounding tissues, symptoms analogous to *thyroidism* have rapidly ensued.

Greenfield (*British Medical Journal*, 1896) has just shown that in Graves's disease there is an actual change in the histological appearance of the gland structure, the epithelial lining of the alveolar spaces becomes more columnar, and the secretion is no longer as colloid as before. Seductive as is the thyroïdal theory, it cannot explain all the cases nor account for all the symptoms. It is unable to explain the many instances where the disease comes on with great suddenness, after fright or emotional disturbance, for we can hardly attribute such cases to a sudden hyperthyroidation, although it is not entirely implausible that such a cause might so alter the nervous mechanism or vascular supply of the gland, especially in those of neuropathic stock, as to produce this condition with great acuity.

A very forcible objection is that the exophthalmos, and even the thyroid enlargement, often occur *unilaterally*, and it is surely difficult to conceive that the assumed toxic effect should be exerted otherwise than symmetrically. Notwithstanding Greenfield's observations, just cited, the pathological findings after operative interference in Graves's disease are rather at variance with the thyroïdal theory, for all sorts of lesions have been described, as well as *none at all*—in other words, the gland has seemed *perfectly healthy*. Still, a gland might *appear* healthy and yet actually contain an excess of toxic material. Putnam (*Brain*, 1894) is not willing to accept this theory as alone operative, and, while admitting that there is strong testimony in its favor, is inclined to attach much importance to disturbance of the emotional centres from various causes, as well as to direct excitation by the enlarging thyroid of the many vagus and sympathetic filaments which ramify so freely in this locality. Paul Marie is convinced that the *primum moriens* is to be sought in some affection of the nervous system, by some assumed to be a *toxic neuritis* of the pons and medulla, from which irritative lesion an exaggerated activity of the thyroid may occur.

Maude (*Brain*, 1894), in a "Critical Digest," concludes as follows: "It is obvious that all over Europe there is a gradual growth of the opinion that this symptom complex is due to the production (or non-elimination) in the thyroid itself of some toxin which acts on the whole nervous system, even to the periphery, though the brunt of its action falls on the vasomotor and neighboring centres. The question of the exact rôle played by the thyroid change is difficult; it is clear that all morbid changes in the thyroid are not operative to produce Graves's disease, but all the cases (in which the gland has been properly examined) show two common factors—cell proliferation and diminution of colloid. Even so, we are in the dark as to whether the morbid change is primary or secondary to some vasomotor disturbance elsewhere, and also as to whether the alteration in thyroid secretion will produce the same effect in a healthy nervous system. Probably some nervous systems are more susceptible than others to the toxic influence, just as they are to alcohol and lead; in fact, the susceptibility of young women to plumbism and Graves's disease is strikingly similar."

Personally, I venture to assert that the relationship existing between Graves's disease and some toxic activity of the thyroid secretion is a fact too evident to be lightly thrust aside. I doubt very much if mere increase in quantity of the secretion can produce Graves's disease, for the giving of thyroid extract in healthy subjects is only followed occasionally by symptoms resembling it. Furthermore, if mere excess of juice were causally active, then the introduction of *more thyroid extract* in the way of relief would not only be absolutely contraindicated, but *positively harmful*, and yet there are numerous cases reported which have

undoubtedly been benefited by the thyroid treatment. If we assume, however, that it is not such quantitative increase, but that a qualitative alteration is brought about, rendering the juice, in some unknown way, *toxic*, we have a very plausible working theory. In that case the favorable influence of thyroid therapy is explicable, as follows: The gland may stop secreting the abnormal natural juice in the presence of the efficient substance, or the healthy animal extract may neutralize the toxic effect of the unhealthy natural substance, or, lastly, the economy may utilize the normal extract, and thus so fortify the system that its own abnormally altered secretion no longer exerts any deleterious influence.

With respect to the more recent explanations of the function of the thyroid and of the real nature of the active therapeutic principle contained in the thyroid extract, I should like to add a few words. Hutchinson¹ has just made a careful chemical examination of the glands. He found various substances which he could class together under two main groups—a proteid and a proteid-free group—both of which he obtained as watery extracts. Of these two only the proteids were therapeutically active. This group could be further resolved into a colloid substance and a nucleo-albumin, and of these two *only the colloid was active*. The colloid matter, therefore, is considered by Hutchinson as *the active ingredient*, and as it contains considerable iodine in organic combination, he considered his substance identical with the so-called *thyroidin* first isolated and described by Bauman.² Bauman has examined the thyroids of sheep, pigs, and men, and found them all to contain iodine to the extent of 0.2 to 0.5 per cent., and iodine was present in his active principle, *thyroidin*, to the enormous extent of 9.3 per cent. I thought it might interest you to have the presence of iodine demonstrated. I have prepared six B. W. & Co.'s thyroid tablets according to Ewald's method.³ By means of this procedure the iodine is freed, and when shaken with chloroform separates out, as you now see, as a beautiful violet fluid. The function of this gland may thus be to abstract iodine from the food where it is present in infinitesimal quantities, to store it up in its interior, and to furnish it to the system as it may be needed. In view of the fact that iodine has always been probably the most reliable remedy in goitre, the discovery of this element in organic combination in the gland itself becomes peculiarly interesting. But one word more with reference to infantile myxædema. The point of greatest interest in this connection is, will the cases keep on progressively improving, or do they reach a certain point, and then remain stationary? The impression made on me by my case, and for this reason I have delayed reporting,

¹ British Medical Journal, March 2, 1896.

² Zeitschr. f. Phys. Chemie, No. 4, 1895.

³ Berlin. Med. Gesellsch. in Deutsche Med. Wochenschr., No. 5.

is that persistence in the treatment will probably be rewarded by a slow but continuous improvement. Where the diagnosis can be made before the second year of life the prognosis will be infinitely better than in more advanced cases. He who makes the diagnosis in early life, and persists continuously in the treatment (for relapses may occur), may even hope to see the germs of thought bud into the beautiful flowers of reason in what was before "the leafless, barren desert of the idiot's mind."

Barbara S., born March 9, 1890, was first seen by me at the Children's Clinic of the Medical College of Ohio, on November 15, 1894. The case-book shows the following record:

Age. Four years and six months.

Family history. Negative as regards the parents. One child died of diphtheria, and one of tubercular meningitis(?).

Past history. Has had trouble with bowels for some time. Poor appetite. First teeth appeared at age of fourteen months. Nursed until two years of age by mother, after that cow's milk.

Present history. Principal diet is milk, also occasionally eggs and crackers. Abdomen protruding; teeth decayed. The child *has never walked*, has always been badly constipated. Anterior fontanelle wide open.

November 19, 1894. Examination (Wolfstein). Upper four incisors and molars badly decayed, all the others very imperfect, the canines pointing through the gums. Glands of neck slightly enlarged; a scar on the left side being evidently a cicatrix from an old open gland. Some slight enlargement of radial epiphysis on both sides; rachitic rosary not present; Harrison's groove well exemplified.

Head. Somewhat square; anterior fontanelles quite patulous; bones soft.

Abdomen markedly protruding; veins distended. Inguinal glands not enlarged; liver and spleen slightly enlarged.

Extremities. Tibiæ very slightly curved; heads of same enlarged. No history of bronchitis, nor of laryngo-spasm.

Skin is markedly anæmic.

This case was, of course, rachitic, but there were additional features which pointed in an entirely different direction. Without stopping to emphasize the points of difference between rachitis and the disease suspected, I shall rapidly review the conditions which led to the correct diagnosis.

(a) *The facial expression.* The head and face appeared rather large and swollen. The expression was one of impassiveness, of stolidity. The eyes, wide apart, had the vacant, dull stare which indicated the absence of intellect. The nose was flat, turned up at the end, while the bridge was depressed. The tongue was markedly thickened, so much so that the mouth could not contain it, and it constantly protruded. This protrusion added greatly to the general impression of imbecility. From the facial expression alone one may make the diagnosis; indeed, one is justified in claiming for infantile as well as adult myxœdema a *pathognomonic facies*. If you will compare the pictures in the various text-books with my case, Fig. 1, January, 1895, the remarkable resemblance between the various cases will become plainly manifest.

(b) The hair was coarse, thick, and of a hemp-like character.

(c) Above both clavicles were several prominent masses—the so-called supra-clavicular fat masses—common to both the infantile and the adult form.

(d) No trace of the thyroid gland could be found. All writers agree, however, that it is very difficult to absolutely exclude the presence of this body *by palpation*.

(e) The abdominal enlargement was very marked—it was the “frog-belly” of rickets somewhat intensified. Digestion was capricious; milk was tolerated, but poorly assimilated. Constipation of the most obstinate nature was the rule, stool only occurring naturally once a week, often not for two weeks. The stools were thin, clayish-yellow in color, and of a *horrible* odor.

(f) The measurements (see table, under heading January 15, 1895) show how dwarfed was the skeleton. The head always fell forward, and there was lateral wobbling due to weakness of the muscles and ligaments. A marked spinal curvature in the dorso-lumbar region (convexly backward) was noted, and is usually present in all cases.

That ossification was evidently very imperfect was evidenced sufficiently by the widely patulous fontanelle, still open at the fifth year. The bones of the arms and legs were stunted in growth, but the latter were not deformed, which is readily understood, for, no attempt at locomotion having ever been made, no weight had been placed upon them. The pelvis was not carefully examined.

(g) The skin was very pale, of a straw-yellow color. The anæmia was evident enough, but an examination of the blood showed H. 55 per cent. Erythrocytes 2,100,000, pale, no erythroblasts. The skin was dry, for perspiration had been in abeyance for years, even in the summer.

The temperature was *always subnormal*. The child was cold objectively and subjectively, and preferred the neighborhood of the stove. Superficial reflexes were absent.

(h) The hands and feet were large comparatively. The spade-like hands and feet are only typical for the adult type.

(i) The child will sit for hours in any position in which it may have been placed, stupidly looking around, never attempting to crawl, nor indicating by any act the possession of any intellect.

The diagnosis of infantile myxœdema was made, and thyroid feeding was clearly indicated. After carefully considering the literature I determined that no one of the various methods, such as (1) subcutaneous injection of the glycerin extract, (2) ingestion per os of the aqueous or glycerin extract, (3) ingestion per os of the thyroids, raw or slightly cooked, had any advantage over the simple administration of the dried powdered glands in tablet form. To-day I do not hold so religiously to this opinion, for in an obstinate case with the proper environments, I think I should try the glycerin extract made from glands removed aseptically, or feeding the fresh glands lightly broiled. At the very outset of the treatment I used Armour & Co.'s tablets, which seemed to be very active and quite satisfactory, but for the most part the tabloids made by Burroughs, Wellcome & Co., England, have been employed. Treatment was commenced late in January, 1895 (Fig. 1). One tablet (5 grains) was given three times daily. The effect was simply astonishing, I might almost say, alarming. The weight of the child fell from nineteen and one-half pounds to thirteen and one-half pounds within two weeks,

the densely infiltrated skin, which had previously stood out in thick folds, seemed to lose substance, the solid œdematous material literally melted away; the lines of the muscles, before obliterated, came into view. The prominent smooth abdomen became flatter, the abdominal muscles stood out plainly. The skin, which had been so cold and dry, began to be warm; the sweat-glands manifested a willingness to resume function, and for the first time in years perspiration covered the body. The effect on the nervous system was so marked as to give rise to some apprehension, but a very kind letter from Dr. Geo. W. Crary, of New

FIG. 1.



January, 1895.

York, whose authority in this field is recognized, reassured me. This child, which had formerly slept by preference, became exceedingly restless, all night long; the mother said its body jerked, its muscles twitched, and sleep was absent. With the greatest difficulty could I induce the mother to continue the treatment.

Marked diuresis was observed, and was the more noticeable as micturition had been rather infrequent, and the amount small. It was clear that the child was being profoundly influenced by some substance of

great therapeutic power, and it was deemed advisable to diminish the dose. Only one tablet daily was now given, and, indeed, whenever the dose has gone above one and one-half tablets daily, the condition produced has been *one of extreme excitation*. The temperature returned to normal, but no febrile reaction was ever observed. About the middle of February the child was taken down with a severe attack of bronchitis, so that treatment was discontinued. In April, 1895, the extract was again resumed, and since that time the improvement has been steady and satisfactory. In October, 1895, her condition was as follows (see Fig. 2):

FIG. 2.



September, 1895, after six months' continuous treatment.

The anterior fontanelle is almost completely closed, the face has a more intelligent aspect, the hair is somewhat softer; the child perspires freely. The gain in weight has been about seven pounds, in height about two inches. Attempts at articulation are made, though in this respect the progress is very slow. The tongue is held entirely within the mouth; the skin is warm, and there is some color in the cheeks. Blood examination shows: H. 70 per cent.; erythrocytes, 2,800,000. The child can now stand upright, and if supported takes a few steps. The constipation, which had been so obstinate, had really yielded after the second week of

treatment, and had now given place to diarrhœa, due to difficulty in controlling the diet and to the unfavorable surroundings. The mother was deaf to my most persuasive entreaties to allow the child to be removed to the Jewish Hospital. This I wished to do in order to determine the difference in metabolism as the child improved. These experiments have, however, been made sufficiently elsewhere. In January, 1896, on visiting the child, I found it eating the ordinary food of the other children (though milk is still its staple article of food), and to my delight the child was walking about unassisted. She is still unfriendly with strangers, easily frightened, and often very choleric without adequate motive.

FIG. 3.



April 16, 1896.

April 1, 1896. Found her playing with the other children; seemed quite contented; gave and took objects; shook hands; walked across the room to get a penny (surely a sight of awakening intellect); took note of her surroundings; played with the kitten, and all in all exhibited a degree of improvement which, when contrasted with her previous imbecility, might justly be termed *miraculous*. (See Fig. 3, showing the child standing entirely alone; also measurements taken at this time.) The child has walked two squares without being assisted. Speech is still very rudimentary, but is slowly being acquired.

	1895, Jan. 15.	1895, April 29.	1895, Oct. 15.	1896, April 12,	Boston table. Average for girls.	
					4½ years.	6 years.
Weight	19½ lbs.	19½ lbs.	26½ lbs.	34½ lbs.	38 lbs.	43 lbs.
Height	27½ inch.	28½ in.	30½ inch.	34½ inch.	40 in.	43½ in.
Circumference of head . . .	17½ "	18 "	19½ "	20 "		
" chest (nipple) . . .	19½ "	19½ "	20 "	21 "		
" abdomen	19½ "	18½ "	20½ "	21½ "		
Length { from base of neck } .	6¾ "	7 "	11½ "	12½ "		
Length { " base of spine } .						
Length of leg	12½ "	12½ "	14½ "	15½ "		
" of arm to wrist . . .	7¾ "	8 "	9 "	9½ "		
Blood	{ H. 55 p. ct. R. 2,000,000	70 p. ct. 2,800,000	80 p. ct. 3,100,000		

ON "DRY MOUTH," OR XEROSTOMIA.

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THE condition of "dry mouth," to which the term "xerostomia" was subsequently applied, was first brought prominently under the notice of the profession by Mr. Jonathan Hutchinson and the late Dr. W. B. Hadden in the year 1888. The disease must be an extremely rare one, as so very few cases have been recorded since that time. The features of the malady are marked, and cause so much discomfort to the patient that the cases would be likely to attract the attention of any observant practitioner, and the importance, also, of such a condition, as bearing upon the relation of the nervous system not only to the secretion of the glands of the mouth, but also to secreting organs in other parts of the body, is one which renders it desirable that cases of xerostomia should be recorded.

The following case is a well-marked instance of the affection, associated with which in this instance is an enlargement of both parotid glands:

Mrs. M., aged thirty years, was brought to me by Dr. Chadwick, of Heaton Chapel, on February 20, 1894. She complained of intense dryness of the mouth and of great discomfort arising therefrom.

Mrs. M. stated that she had been troubled with the dryness of the mouth for the past three years, and that it had come on after a slight febrile attack which she believed to be influenza. During the whole of the past three years the mouth had never been moist. The swelling behind the angles of the jaw she had also noticed for about three years, and it likewise had been present ever since; but was now somewhat less than it was twelve months ago. For about the same time she had been troubled with shortness of breath and palpitation and had been getting paler, but she stated that she never had had a fresh complexion. Pre-

vious to three years ago she had enjoyed excellent health, and had never had any illness.

She had been married six years, but had no children, and had never had any miscarriages nor any stillborn children. There was no history of any syphilitic symptoms. She was one of a family of ten; three brothers or sisters had died in infancy; the other six, who were grown up and varied from twenty-two to thirty-five years of age, were all in excellent health. Her father, aged fifty-three years, was living and in good health; her mother died at thirty-eight years of age, two weeks after a confinement (up to the time of delivery the mother had had good health).

Mrs. M. was extremely anæmic; she was very nervous, and, in addition to the dryness of the mouth, she complained of palpitation. The dryness of the mouth was especially troublesome to her, and she said the dry burning sensation in the mouth was always there, but varied a little in intensity from time to time, and she had frequently to sip cold water to afford relief. Any acid drink or food, such as stewed rhubarb, caused her great pain, and, having tried many things, she found nothing gave her so much relief as cold water. Glycerin preparations caused considerable pain.

The tongue was absolutely dry and was much fissured. When I first saw her it was quite clean, but she said that it became coated with black sordes if she did not attend to it. The gums and inner surface of the cheeks were dry. The soft palate was dryish, but presented a little sticky mucus at various places. The posterior wall of the pharynx was distinctly granular. There was slight moisture there, but even that part was deficient in this respect. No affection of the mucous membrane of the mouth, except the dryness, could be detected; it was not unusually red. She had very perceptible enlargement of both parotid glands. The glands were not excessively large, but the enlargement was sufficient to be very noticeable on either side, and gave her the appearance of a person with a mild attack of mumps. The enlargement of the parotids was uniform, unaccompanied by any pain, and there was no tenderness on pressure. Each gland felt very dense and firm. The orifice of each parotid duct in the mouth was natural, and by firm pressure and massage along the course of the duct a very little glairy secretion, like tenacious mucus, could be squeezed from each duct.

No enlargement of the sublingual or submaxillary glands could be detected.

There was no affection of any of the lymphatic glands in the neck.

She had no teeth except false ones. She stated that she formerly had very good teeth, but that during the last few years, and she thought during the last three years, while the dryness of the mouth had been present, they had appeared to her to crumble away. She was quite certain that at the time of her marriage, six years ago, her teeth, with the exception of one, which she then had to have stopped, were very good.

The mucous membrane of the nose was somewhat, but not excessively, dry.

The taste, as might be expected in so dry a condition of the mouth, was very defective. She could not taste either quinine or saccharine on the front or back of the tongue on either side, even when the tongue was well moistened with water. When she swallowed she was able to taste

a little, but the sensation was so slight that I could not help feeling in doubt as to whether the defect of taste was entirely due to the present dryness of the mouth or whether it was not, possibly, due to some change in the nerves or their endings in the mouth. Neither asafetida nor musk caused any sensation of smell in the right nostril, but they did to a slight degree in the left nostril.

The larynx presented no abnormality. The conjunctivæ were moist and, except being anæmic, were healthy.

No disease of the heart, lungs, or any other organ could be discovered. The blood was examined, but nothing more than what is found in anæmia was observed.

The urine was 1010 specific gravity, and contained neither albumin nor sugar.

The menstruation was regular, but somewhat profuse. (On account of the relation of enlargement of the parotids to affections of the pelvic organs, Dr. Chadwick, a few days later, made a specially careful examination of those parts, but was unable to find any disease of any organ in the pelvis.)

The skin was somewhat, but not excessively, dry. Mrs. M. stated, however, that she perspired very little, even in the summer.

The pupils were equal, and presented nothing abnormal.

The patient has been under my observation now for over three years. Arsenic, iron, iodide of potassium, and tincture of jaborandi were tried successively, but without any apparent benefit. A faradic current applied daily to each parotid gland, and each gland submitted to gentle massage, appeared to give temporary relief and to reproduce a certain amount of moisture in the mouth. Mrs. M., however, found so little relief from any treatment that for many months she has ceased to adopt any.

In the cases of "dry mouth," or xerostomia, which were brought before the Clinical Society of London about nine years ago by Mr. Jonathan Hutchinson¹ and the late Dr. W. B. Hadden,² the chief features were the arrest of the secretion of all the salivary and of the buccal glands, but there was no enlargement of the parotids. We have in the above case, however, in addition to the arrest of the buccal and salivary secretions, an enlargement of both parotid glands, a feature which has not usually been found in cases of xerostomia. About five years ago Mr. Jonathan Hutchinson published³ two cases of "relapsing parotitis," one of which was associated with well-marked xerostomia and the other with polyuria and a certain amount of dryness of the mouth. In the case above recorded we have not to do with a relapsing parotitis, but with a permanent enlargement of the parotids. Whether the enlargement is inflammatory or due to simple retention of secretion in the gland cannot be definitely stated, but the former is much more probable. This association of enlargement of the parotids with xeros-

¹ Clinical Society's Transactions, xxi. p. 180.

² Ibid., p. 176.

³ "On Liability to Recurrent Parotitis with Xerostomia," by Jonathan Hutchinson, LL.D., F.R.S.: Archives of Surgery, April, 1892, lii. No. 12.

tomia is extremely interesting, but the explanation of it is not at first sight very evident.

In the records of the majority of the cases of xerostomia we have no mention of enlargement of the parotids, and in several it is expressly stated that those glands presented nothing abnormal.

In xerostomia, also, we have not only an arrest of the secretion of the salivary glands, but of that of all the buccal glands, so that an affection of the parotid glands or of all the salivary glands will not explain the features of xerostomia, in which condition the secretion of the mucous glands of the mouth is likewise arrested. The most probable explanation of the association of enlargement of the parotid glands with xerostomia is that both are due to a common cause and are not otherwise connected. It seems most probable that xerostomia is the result of a functional derangement of the nervous system, and that the same nervous affection produces in some instances a relapsing parotitis or a more permanent enlargement of the parotid glands. Unfortunately, this explanation does not carry us much further; we still have no idea of the cause of the functional nervous derangement, and cannot say with certainty what particular part of the nervous system is at fault. It is also obscure why the parotid glands, and not the other salivary glands, should be enlarged in some of the cases. The number of recorded cases where there has been an affection of the parotids associated with xerostomia, so far as I know,¹ is only two in addition to the one at present under consideration, a number far too few to allow of any conclusions being drawn.

The association of the parotid with other diseases does, however, seem to be a much more intimate one than the association of the other salivary glands with the same diseases. The cases recorded by Mr. Stephen Puget² of parotitis, both suppurative and non-suppurative, following injuries and diseases within the pelvis or abdomen clearly show that there is a connection between such injuries and diseases and the parotid glands, and the same connection does not appear to exist between the same diseases or injuries and the submaxillary or sublingual glands. It is impossible not to agree with the author that the most probable explanation of the cases of parotitis following injuries or diseases within the abdomen or pelvis is that it is due in some way to reflex nervous action.

In the case above recorded no disease of any organs can be found which, by any reflex action, might account for the xerostomia or for the enlargement of the parotids. The woman is, however, an extremely

¹ I have not included here a case where a temporary condition of dry mouth & "stomatitis" and attack of parotitis, recorded by Mr. H. St. C. Buxton, in the *Lancet* for 1887, p. 1167.

² "Parotitis after Injury or Disease of the Abdomen or Pelvis," by Stephen Puget, *British Medical Journal*, March 17, 1887, also *Lancet*, 1887, p. 732.

nervous one, and the case appears to support the view that xerostomia is to be regarded as the result of a functional derangement of the nervous system.

The parotid enlargement is neither the cause nor the consequence of the xerostomia, but probably produced by the same nervous disturbance as that which causes the arrest of both the salivary and the other buccal secretions. As to what is the nature or cause of the nervous derangement, we cannot at the present time give any explanation, any more than we can explain the varied nervous disturbances which we meet with in neurotic individuals.

It is easy to understand the increase or diminution of the secretion of any gland under the influence of the nervous system, but it is not so clear how a functional derangement of the nervous system produces an enlargement of the parotids, such as is described in the above case. It is not probable that the enlargement is due to retained salivary secretion, because otherwise we should expect a similar change to be found in the other salivary glands, which are, however, unaffected except in so far as they have ceased to secrete. The enlargement of the parotids in the cases of injuries and diseases to the abdominal and pelvic organs is usually acute, and goes on to suppuration; but in a considerable proportion of the cases, where the termination of the case was recorded, the glandular affection resolved without suppuration.

We may therefore look upon those cases of parotitis secondary to abdominal and pelvic lesions as to a certain extent explanative of the enlargement of the parotids in some cases of xerostomia. In the secondary affections the enlargement of the parotids would be in some way affected by the reflex action of the nervous system, while in the cases of xerostomia we should have a primary functional derangement of the nervous system producing an arrest of the salivary and buccal secretions, and causing an enlargement, probably of an inflammatory nature, of the parotids.

It is noteworthy that nearly all the cases of xerostomia up to the present time recorded have occurred in people advanced in years, and, with two exceptions, all in the female sex. In the majority of cases the condition, at the time they were recorded, had existed many years, and, with the exception of pilocarpine, nothing had given much relief, and sometimes that had failed in this respect entirely.

The cases which I have been able to find recorded may be briefly here recapitulated:¹

CASE I.—Widow, aged sixty-five years. Duration, three years. Health good. Condition unrelieved at the time the case was recorded. (Mr. Hutchinson's case.)

¹ This list was made about three years ago, and I have not had an opportunity of looking up the literature since that time.

CASE II.—Widow, aged sixty-five years. Duration of condition at time of the report, seven months. Health good. (Dr. Hadden.)

CASE III.—A lady, aged sixty years. Duration, ten years. Health good. Condition unrelieved at the time of the report. (Dr. Rowland's case, quoted by Dr. Hadden.)

CASE IV.—A widow, aged fifty years. Duration, four years. Health good. Unrelieved at the date of the report. (Mr. Hutchinson's second case.)

CASE V.—A lady, aged seventy-seven years. Duration, eight months. Good general health. (Dr. A. G. Bartley's case, quoted by Dr. Hadden.)

CASE VI.—An old lady, who suffered from dry mouth during the last few years of her life. The cause of her death was not connected with her mouth trouble. (Dr. Barlow's case, mentioned by Mr. Hutchinson.)

CASE VII.—Lady, aged fifty-two years. Xerostomia, associated with recurrent parotitis, during twenty years, and also with recurrent pustular ophthalmia. Some slight improvement took place under treatment with jaborandi. (Mr. Hutchinson's third case.)

CASE VIII.—Lady, aged fifty-four years. Recurrent parotitis and attacks of polyuria associated with a certain amount of dryness of the mouth during two years. The case appears to be chiefly noteworthy as an example of recurrent parotitis and attacks of polyuria, while the features of xerostomia were not very pronounced. (Mr. Hutchinson's fourth case.)

CASE IX.—Widow, aged forty-four years. Duration, seven years. Patient succumbed to enteric fever. (Case recorded by H. Aretander, in *Ugeskrift for Læger*, 3 Mai, 1890; abstracted in *Centralbl. für Laryngologie, Rhinologie, etc.*, December, 1890, vii. Jahrg., p. 251.)

CASE X.—Case recorded by H. Summa in the *Alienist and Neurologist* for April, 1890. Except for a short abstract of this case (*Centralbl. für Laryngologie, etc.*, viii. Jahrg., July, 1891, p. 17), I have been unable to confirm it.

CASE XI.—Male, aged seventy-five years. Duration, at least four years, possibly longer. General health good. Pilocarpine relieved the condition. (Seifert, *Wiener klinische Wochenschrift*, 1889, p. 881.)

CASE XII.—Male, aged sixty-five years. General condition of patient good, but he was a very anxious and nervous fellow. Duration at least three years. Relieved by the persistent use of pilocarpine. (Seifert's second case, *Wiener klinische Wochenschrift*, 1889, p. 881.)

In addition to the above, several cases were briefly referred to at the discussion¹ on the subject of xerostomia, at the Clinical Society of London, by several of the members, as having come within their experience.

¹ Reported in the *Lancet* for 1888, p. 868.

REVIEWS.

GENITO-URINARY SURGERY AND VENEREAL DISEASES. By J. WILLIAM WHITE, M.D., Professor of Clinical Surgery, University of Pennsylvania; and EDWARD MARTIN, M.D., Clinical Professor of Genito-urinary Diseases, University of Pennsylvania. 8vo. pp. 1061, with two hundred and forty-three engravings and seven colored plates. Philadelphia: J. B. Lippincott Co., 1897.

At the present day, when genito-urinary surgery is making such rapid strides as a separate and distinct branch of general surgery, there must of necessity be a constant demand for an exhaustive treatise upon this branch of medicine. Such a work is the volume now before us, the size and completeness of which cannot but impress one with the fact that the genito-urinary surgeon of the present day occupies a position in the profession which is of dignity and importance second to none. This work, coming as it does from the hands of men eminent both as teachers and practitioners of genito-urinary surgery, cannot but rapidly become a standard book upon this subject, and deservedly so, as it is undoubtedly the most comprehensive and the ablest treatise on genito-urinary and venereal diseases before the profession in America to-day. One very great charm possessed by this book is, that, while being thoroughly scientific and up-to-date in every particular, it is at the same time practical in all of its details, as regards treatment; and the busy practitioner of medicine with very little time, or perhaps, inclination to wade through tedious discussions on theoretical matters, can here find the practical points that he needs most to aid him, quickly and easily, without having his mind befogged by long and confusing dissertations upon unestablished theories.

That this practical feature of the work was particularly in the authors' minds is indicated very clearly in the preface, where they say "that it was their wish to make this book one of practical use to the physician; much space has been devoted to symptomatology, diagnosis, and treatment, avoiding discussions of questions still unsettled."

This is the policy which will undoubtedly appeal most strongly to the general practitioner of medicine. On the other hand, the specialist, to whose lot it falls to unravel the hard and oftentimes knotty problems in genito-urinary surgery, will find, we are sure, this work an invaluable aid.

At the first glance over the book we are struck with the fact that the arrangement of the subjects is not that usually followed in text-books on genito-urinary surgery and venereal diseases.

The first and second chapters are taken up in discussing diseases and injuries of the penis and urethra. The succeeding twelve chapters are devoted to the three venereal diseases gonorrhœa, chancroid, and syph-

ilis. Genito-urinary surgery occupies the last half of the book. Considerable attention is paid in the first chapter to the operation of circumcision, the details of this little operation being given with an exactness and thoroughness which we do not recall having seen equalled in any article on this subject. The cuts illustrating the various steps of the operation are excellent, and to one needing help in performing this operation they would prove of great service.

Gonorrhœa and its complications in men and women are very ably handled in three chapters. In pursuance of the policy of the authors as outlined in the preface, no time is wasted in presenting all the conflicting testimony in regard to the gonococcus as the etiological factor in gonorrhœa. The position they assume is that gonorrhœa is an infectious disease, undoubtedly due to the presence in the urethra of the gonococcus. At the same time, it is admitted that it is possible to have a urethral inflammation, with abundant discharge, which does not depend upon the gonococcus, but is due to the entrance into the urethra of ordinary pus micro-organisms.

Three forms of urethral inflammation are described: 1. Infectious urethritis, or true gonorrhœa; 2. Non-infectious or simple urethritis; 3. Subacute or catarrhal gonorrhœa. Under the form last mentioned, there is described a subacute infectious urethritis characterized by scanty, muco-purulent discharge with few gonococci, no subjective symptoms occurring in the urethra, the mucous membrane of which has been permanently damaged by one or more previous attacks of gonorrhœa.

Under the head of acute posterior urethritis we note, with pleasure, the space devoted to the discussion of the importance of the two-glass test in determining the presence or absence of total urethritis. This point, the value of which is so little understood by the general practitioner of medicine, is ably brought out on page 102, and should be carefully studied by all physicians undertaking the treatment of gonorrhœa.

In taking up the subject of the treatment of gonorrhœa, attention is first paid by the authors to the abortive treatment of the disease by injections of nitrate of silver; this is considered as having a very limited use, being applicable in but few cases.

Two general methods of treatment are discussed at some length. First, the use of internal medication, combined with the employment of hand injections by the patient. Many excellent formulæ are given, all of which will be found most useful in the treatment of the disease by this method. The second form of treatment considered is that of copious urethral irrigation. While pointing out all the undoubted merits which this method possesses, the authors frankly admit that it also has great disadvantages—namely, that the performance is time-consuming, the apparatus cumbersome and likely to attract attention. These objections are weighty, and, in the long run, will prevent this plan of treatment from being universally adopted.

In the treatment of chronic urethritis the writers emphasize two points particularly, viz.: the dilatation of the urethra by the passage of full-sized sounds, and the cure of the chronic urethral catarrh by copious irrigations of nitrate of silver. As regards the use of the urethroscope in the treatment of this condition, attention is called to the fact that it should rarely be used until the urethra has become accustomed to the use of instruments by the previous passage of sounds:

and in these cases, where, as so often happens, its use is followed by increased discharge, we are advised to abandon the instrument altogether.

Chapter VI. deals with stricture of the urethra, and is, in our judgment, one of the best chapters in the work. Stricture of the urethra is considered to be due not only to a chronic contracting peri-urethral inflammation, but also, as pointed out by Harrison, to constant urine leakage through mucous membrane denuded of epithelium. We are pleased to note that the Otis scale is not adhered to in restoring the urethra to its normal calibre, the writers being of the opinion that the urethrometer, employed according to the method devised by Otis, merely demonstrates the extent to which the urethra can be distended.

It is an additional gratification to note that, with some few exceptions, gradual dilatation is recommended as the treatment to be preferred in all strictures. Internal urethrotomy is reserved only for fibrous or resilient strictures anterior to the bulb. For dense, unyielding strictures in the bulbo-membranous region external urethrotomy is advised.

A part of Chapter VII. is devoted to the best methods of keeping and taking care of urethral instruments. This is a constant source of trouble and anxiety to a genito-urinary surgeon, and it is only surprising that the matter has received so little attention in previous text-books on genito-urinary diseases.

In discussing the question of the etiology of chancroids, it is interesting to note that the authors incline rather to the opinion that chancroid is due to a specific virus of its own. This appears to be the trend of thought at the present day among those having the most extended experience in venereal diseases.

The section devoted to syphilis, occupying six chapters, is, to our mind, the ablest in the work. Want of space in this review forbids our calling attention to little more than the comprehensive way in which this subject is handled. There are, however, a few points which seem to us to be worthy of special note. The first of these is the complete table on pages 314 and 315, comprising the differential diagnosis between chaneroid, chanere, and herpes.

Such a table cannot help but be of the greatest service to the general practitioner. The same commendation may be given to the tables giving the differential diagnosis in sub-preputial or concealed disease, and also the diagnosis between urethral chanere and gonorrhœa. Another most excellent feature to which we desire to call attention is the table on page 336, giving the general distinguishing features of all syphilides or eruptive skin lesions. Again, the classification of these lesions, on page 342, is worthy of special commendation, by reason of its great simplicity. Under the head of Syphilis and Marriage, it is interesting to note that the authors, while believing that in the great majority of cases syphilis can be cured, state, however, very positively that there is no absolute safety, as regards transmission of disease to the offspring, until four years of steady treatment have been undergone. The point is also made, and should be carefully noted, that it is during the first year of syphilis that the disease is most likely to be conveyed to the child.

In discussing the prophylaxis of syphilis the writers, while urging a more general dissemination of knowledge in regard to the disease, strongly insist that those affected with syphilis should be warned against

the danger of infection. At the same time, a strong plea is made for licensing prostitution and for legal supervision of the prostitute, and consequent protection for the general public.

The statements of the authors concerning that much-discussed question as to the administration of mercury prior to the appearance of secondary manifestations, are very clear, and, coming from such authorities, must of necessity carry considerable weight. The rule here laid down is—never to administer mercury before the appearance of secondary symptoms, except where one is sure that the sore is a chancre, which is not often the case, and where the diagnosis is still further confirmed by confrontation. One cannot help but be impressed with the fact, in going over the treatment of syphilis as outlined in this treatise, that it is the constant intention of the writers to point out and insist that not only the disease, but the patient also, must be treated. This is a most valuable point, and one so often overlooked by the general practitioner of medicine, who is apt to see in a given case of syphilis nothing more than an indication for the internal administration of either mercury or iodide of potassium. Indispensable as these drugs are, it should always be borne in mind that in many cases very much more is needed.

Chapter XVI., on the examination of the urine, is an extremely valuable contribution to the work, and is a decided novelty in books on genito-urinary diseases. But that such a chapter should be considered necessary in a work of this character is still further evidence of the fact that there can no longer be any hard-and-fast line drawn between the medical man and the genito-urinary surgeon.

As would naturally be expected, the chapter on enlarged prostate and its treatment is a most instructive and important feature of the work, giving in an admirable manner all the methods of treating this troublesome condition. The operation of castration, first devised by Dr. White, for the relief of enlarged prostate, is discussed at some length and the indications for the operation very fully detailed.

In conclusion, it only remains for us to extend our congratulations to the authors upon the appearance of their book, which is surely destined to occupy a leading position as an authority in genito-urinary surgery.

H. M. C.

THE PRINCIPLES OF THEORETICAL CHEMISTRY, WITH SPECIAL REFERENCE TO THE CONSTITUTION OF CHEMICAL COMPOUNDS. By IRA REMSEN. Fifth edition, thoroughly revised. 12mo. pp. x. 320. Philadelphia and New York: Lea Brothers & Co.

A work, especially a text-book in chemistry, that has gone through five editions in a comparatively short time, cannot hope nor fear much from the reviewer. The present edition of Professor Remsen's well-known work presents but little difference from its immediate predecessor. There have been but few pages added, those devoted to stereochemistry. The greater portion of the book is beyond the necessity of criticism or review; it is universally recognized as a conservative and concise exposition of the prevailing theories in regard to the structure of chemical compounds. In the preface we are told that the author

has resisted the temptation to bring the book more into keeping with the modern trend in chemistry, especially physical chemistry. This statement is repeated frankly from the fourth edition; we trust that it will not be repeated in the sixth. It is to be sincerely hoped that the learned author will give us in the next edition a good exposition of the views which have lately been so actively exploited, and which are mostly presented in forms but little available for the average teacher. We would suggest, also, the introduction of a complete table of the elements, with atomic weights as determined by the latest researches. The index is rather scanty. H. L.

PATHOLOGICAL TECHNIQUE: A PRACTICAL MANUAL FOR THE PATHOLOGICAL LABORATORY. By FRANK BURR MALLORY, A.M., M.D., Assistant Professor of Pathology, Harvard University Medical School; Assistant Pathologist to the Boston City Hospital; Pathologist to the Children's Hospital and to the Carney Hospital; and JAMES HOMER WRIGHT, A.M., M.D., Director of the Laboratory of the Massachusetts General Hospital; Instructor in Pathology, Harvard University Medical School. With 105 illustrations. 8vo. pp. 397. Philadelphia: W. B. Saunders, 1897.

THE book which is the subject of this review treats of matters of great and growing importance, with which every physician, though he be not a pathologist or a bacteriologist, should be acquainted. Pathological technique has developed in recent years with a rapidity truly wonderful, and almost every step of its progress has been followed by some great discovery.

Perhaps the importance of technical knowledge is best exemplified in the history of the development of bacteriology. The theory of a *contagium vivum* may have had its origin contemporaneously with that of spontaneous generation, though the first mention we can find of it is by M. Terentius Varro, a contemporary of Cicero. It, however, for ages remained but a crude theory, and was not fully developed until the latter part of the present century.

The important advances in our methods of research, which culminated in firmly establishing bacteriology upon a scientific basis, may be said to have begun in 1854, when Schröder and Van Dusch demonstrated the utility of cotton-wool. Then followed principally by Koch and Pasteur. In 1877 Weigert introduced aniline dyes for the staining of bacteria, and the success of this innovation greatly stimulated the study of micro-organisms. In 1881 Koch brought forward the solid culture media and the plate method, a contribution to our resources fraught with the greatest good to the young science then struggling for recognition. These several discoveries, together with the many brilliant achievements of the workers in the field of bacteriology.

Technique has been as potent a factor in the development of pathology and histology as it has in bacteriology, though in the former influences are less evident than in the latter.

As pathologists and bacteriologists have always appreciated the importance of technique, they have devoted much time and thought to its

development, so that there is now accumulated a vast amount of material. To select from such an abundance only what is most useful and what essential is a difficult task, demanding, as it does of those who attempt it, great practical knowledge, large experience, good judgment, and nice discrimination. That such qualifications are possessed by Drs. Mallory and Wright is amply shown in the little volume entitled *Pathological Technique* which they have just given to the medical profession.

The authors have divided their subject into three parts, as follows: Part I., Post-mortem Examinations; Part II., Bacteriological Examinations; Part III., Histological Methods.

Part I. does not show the careful preparation so evident in Parts II. and III.; nevertheless, it is very good, and both the practising physician and the beginner in pathological research will find in it much information of great value.

The method recommended for conducting an autopsy is a good one, and we have no hesitancy in advising its adoption where none other has been acquired.

The vital point in conducting an autopsy is method. It matters not how adept the operator may be with the knife, or how thorough his knowledge of pathology, the whole object of the examination may be defeated unless he pursue his investigations in a methodical manner.

Under the headings "General Rules" and "Suggestions to Beginners" are grouped a number of practical hints with which every physician should be conversant.

The remarks upon private autopsies are quite pertinent; and were the precautions advised by the authors always observed the objections to autopsies so generally held by the laity would, to a great extent, be removed.

Positive directions are given for preventing the mutilation of the corpse and the defilement of its coverings, and for preserving the cleanliness of the room wherein the autopsy is held.

In Part II. the presentation of "Bacteriological Examinations" is ably accomplished. It is condensed within a very limited space, and is entirely free from ambiguity, for we may carefully con over the work, page by page, from the beginning to the end of the section, without meeting a passage in which the idea to be conveyed is involved in doubt.

In the first few pages a brief description is given of some of the necessary apparatus for pursuing bacteriological studies, and the chief value of this section is its brevity.

Full instructions are given for the preparation of culture media, the staining and mounting of cover-glass spreads of bacteria, the study of bacteria in tissues and in cultures, the securing of pure cultures, the inoculation of animals, and, in fact, all the essential features of bacteriological technique.

In Bacteriological Diagnosis the more important pathogenic bacteria are described and the peculiar characteristics of each organism noted.

In those instances where special culture-media are required for the propagation of certain micro-organisms, explicit directions are given for the making of those culture media, so that the entire section is replete with the most useful information.

The feature of Part II., sure to be appreciated by every progressive physician, is that devoted to the discussion of clinical bacteriology.

Here one may seek, and not in vain, for the most recent developments in applied bacteriology. Those methods by which it is determined whether or not the causal factor of a disease is a micro-organism receive such careful treatment that many physicians will be enabled to supplement their physical examinations of cases, in which the diagnosis is obscure, by bacteriological investigations; or, if they cannot themselves carry out such investigations, they will find full instructions for collecting the material to be forwarded to a bacteriologist.

The high standard set in Part II. is fully maintained in Part III.

All the various details essential to a thorough examination of specimens are given under appropriate headings.

We deem it unnecessary to particularize the many good features of Part III.; there is one, however, worthy of note, and that is the section treating of the methods employed in the examination of animal parasites.

The description of the examination of the urine is very meagre. Had the authors treated this subject with the consideration its importance warrants, we think that the value of the book would have been greatly enhanced.

Throughout the book there is such an excellent arrangement and classification of the subject, that frequent references to the index are unnecessary. This is, indeed, a very pleasing feature, and we would that all authors were, in such particulars, as painstaking as Drs. Mallory and Wright.

The publishers, too, have ably acquitted themselves.

The book has a neat and substantial binding, the paper is of an excellent quality, the type clear and distinct, and the illustrations numerous and well executed.

In closing this review, the book is one that may be heartily recommended to the pathologist, bacteriologist, and practising physician, and we trust that it will meet with the favor it deserves. D. B.

AMBROISE PARÉ AND HIS TIMES, 1510-1590. By STEPHEN PAGET. 16mo., pp. 308. New York: G. P. Putnam's Sons, 1897.

MR. STEPHEN PAGET has come before the profession recently with two biographies of the Heroes of Medicine: The life of John Hunter and the volume under review. The profession cannot be too familiar with its heroes, among whom in the very first rank as a surgeon is Ambroise Paré. The life before us is very well told in an excellently printed and beautifully illustrated volume. Paré is allowed to tell a large part of the story himself, and it makes a most entertaining volume. The arrangement of the volume does not seem to us as happy as it might have been if the "Journeys in Divers Places" and the "Notes" had been placed toward the end, instead of being interpolated between his early life and his life in Paris, though there is some chronological justification for it.

His account of some of the battles he witnessed and the after-history of the prisoners throws a curious light on the manners of the times. For example, when M. de Vaudeville took M. de Bauge, one of the nobility, a prisoner, M. de Vaudeville, to whom he was unknown, recognized him as a gentleman of good family; he made him pull off his stockings,

and, "seeing his clean legs and feet, and his fine white stockings, knew he was one to pay a good ransom." He bought him from the soldiers for thirty crowns. Later, the Queen of Hungary and the Duc de Savoie sent word to M. de Vaudeville that "this mouthful was too big for him [how near to our modern slang!], and he must send his prisoner to them, which he did, as he had other prisoners enough without him." The ransom paid was forty thousand crowns, without other expenses. Fighting seemed then to be personal, and the taking of prisoners very profitable from a pecuniary point of view—very different from our modern methods of warfare. His account of the plague is both interesting and instructive. The absolute want of sanitary arrangements and the atrocities perpetrated during the plague are vividly portrayed.

We can commend the book, to any one who is not familiar with Ambroise Paré's life, as one that will both instruct and interest him.

W. W. K.

TRAUMATIC INJURIES OF THE BRAIN AND ITS MEMBRANES; WITH A SPECIAL STUDY OF PISTOL-SHOT WOUNDS OF THE HEAD IN THEIR MEDICO-LEGAL AND SURGICAL RELATIONS. By CHARLES PHELPS, M.D., Surgeon to Bellevue and St. Vincent's Hospitals. 8vo. pp. 582, with forty-nine illustrations. New York: D. Appleton & Co., 1897.

THIS remarkable work appears certain to rank among the first upon the subject of traumatism of the cranial contents, if, indeed, it does not occupy the position of pre-eminence. It is a fit companion volume to Macewen's far-famed *History of the Pyogenic Inflammations of the Brain and Spinal Cord*, and, with it, forms a splendid summary of modern knowledge of cerebral, infective, and traumatic disorders. As stated in the preface, it is designed to be a concise and systematic exposition of the injuries which the brain suffers from external violence, a division of brain surgery which has the greatest practical importance and has received the least careful attention. It has been based essentially, if not entirely, upon an observation of five hundred consecutive cases of recent occurrence. The picture which they represent is complete in every respect save secondary pyogenic infection of the brain substance, but even this deficiency has been supplied by a condensation of the views of Macewen as expressed in the above-mentioned volume. These cases are so large in number, varied in character, and complete in detail as to have afforded the distinguished author ample materials from which to build up this comprehensive and satisfactory treatise.

The volume is divided into three parts. Part I. is concerned with general traumatic lesions, embracing general considerations of cranial fractures, as well as their pathology, symptomatology, diagnosis, prognosis, and principles of treatment. The intracranial traumatic lesions are classified as hemorrhages, thromboses of sinuses, contusions, lacerations and their sequelæ, as meningeal and parenchymatous inflammations, usually septic, and atrophy. Hemorrhage is studied under the headings of epidural, pial, and cortical. Concussion of the brain is eliminated as a relic of the past without scientific basis, and for its phenomena the lesions of contusion and laceration are made responsible. All symptoms are held to result from demonstrable organic changes. By the elimination of the terms "encephalitis" and "compression," the study of symptoms has also been much clarified. "As each form of intracra-

nial injury is attended by characteristic outward manifestations, and as no evidence exists that these occur independently of anatomical change, symptoms should be grouped under the name of their pathogenic lesion." The chapters on symptomatology are exceedingly valuable, and contain many new and surprising facts. The thoroughness, exactness, diligence, and judicial mind of the author are here in especial evidence. The studies of hemilateral pulse and temperature variations, unreliability of pupil variations, and the seemingly proved relation between emotional and intellectual derangements and lesion of the left frontal lobe are all of great importance. He doubts if ataxia is ever occasioned by cerebellar laceration, but considers that clonic contraction or tetanic spasm is symptomatic of cerebral laceration, and, to some extent, indicative of the region involved. "The comparative frequency of some form of aphasia in recovering cases is a probable result of general rather than local lesion." Early and perfect restoration of such cases would point to circulatory rather than structural disturbance. Loss of control of bladder and rectum is almost always due to laceration of cerebral parenchyma. These chapters fairly bristle with practical hints and deductions. Those devoted to treatment are admirable and properly conservative summaries of modern knowledge without any especial additions by the writer.

Part II. exhaustively treats of the medico-legal and surgical relations of pistol-shot wounds of the head. The total number of experimental pistol wounds of the cranium made for this study was in excess of a thousand! The chapter on surgical relations is based on one hundred and thirty-six clinical cases, in addition to the cadaver wounds. Accompanying the chapters on medico-legal relations are forty-one full-page photographic reproductions.

Part III. contains 189 pages devoted to the condensed histories of 300 selected cases of intracranial traumatism. Of these, 235 were verified by necropsy. In all they afford a perfect mine of facts concerning almost every possible type and variety of brain and cranial injury.

The book is well made and the illustrations are excellent, but the absence of an index is a very serious defect. Without an index, much of the extraordinary information contained in the volume will remain in oblivion.

T. S. K. M.

TRANSACTIONS AMERICAN SURGICAL ASSOCIATION. Vol. XIV., 1896.
Philadelphia: Wm. J. Dornan.

THIS volume contains a number of important articles which were read and discussed at the meeting of the Association, May, 1896.

The admirable address of the President, Dr. Tiffany, on "Intracranial Operations for the Cure of Facial Neuralgia," is instructive. He records 108 cases of facial neuralgia that have been operated upon by the intracranial method, with a mortality of 22 per cent.; shock and sepsis are the chief causes of death, and he claims that the large mortality will be greatly diminished by the adoption of an improved technique, with increased experience.

The intracranial operation is recommended when more than one branch is affected, when the pain is not the expression of a constitutional disease, and when other measures have failed to relieve.

Dr. Senn's article on "Tuberculosis of the Male Genital Organs" is very important, because the literature on tubercular affections of these organs is scanty as compared with the literature on tubercular affections of the lungs, pleuræ, peritoneum, lymphatic glands, bones, joints, meninges, and the skin.

Dr. Fowler's article on the "Surgery of Intrathoracic Tuberculosis" is interesting and instructive. He reviews the subject from the Hippocratic era of the science and art of medicine up to the present date. Dr. Willard, in speaking of "Tubercular Infection of Superficial Glands," says they are a constant menace to the system, and should be removed. During thirty years' experience he is satisfied that the cases not subjected to operation for this disorder have become tubercular or have died in far larger proportion than the same number from whom the glands have been removed.

The general subject of the "Surgical Treatment of Tuberculosis" was ably discussed.

Dr. Cabot's paper on "Castration for Enlarged Prostate" shows the mortality in 203 cases of 19.4 per cent. So high a death-rate for so slight an operation is surprising and requires an explanation.

One of the most important articles in this volume of the *Transactions* is the one on the "Treatment of Traumatic Lesions of the Kidney, with Tables of 155 Cases," by Dr. W. W. Keen. One of the leading features of the article is the attention given to partial nephrectomy. He insists on making an exploratory incision when symptoms are threatening, especially if there be marked evidence of hemorrhage. The tables show that secondary nephrectomy is nearly twice as fatal as primary nephrectomy.

Dr. Roswell Park, on "Surgical Infection," contends that, since the inauguration of the so-called antiseptic era, and in our enthusiasm for combating infection from without, we have lost sight of a most important truth, which we cannot afford to disregard, namely, that in this enthusiasm for combating infection from without we have almost neglected, first, the recognition, and, second, the successful prevention of infection from within. Certain it is that in the majority of instances the latter (*i. e.*, infection from within) is much more liable to ensue, and particularly in a class of cases where one is tempted, for one reason or another, to be less careful than he ought to be.

If one reads Dudley P. Allen's paper on the "Effect of Anesthesia upon Temperature and Blood-pressure," he will find, by the observations made upon thirty-five dogs and eighty patients, that it will not do to disregard the loss of heat during prolonged operations.

Dr. Joseph Ransohoff reports an interesting case of fibrosarcoma, with bone-formation. The tumor weighed eighteen pounds, and was situated on the postero-internal aspect of the right thigh. The tumor was successfully removed and there was no recurrence one year after the operation.

Dr. Mixer presents two brief articles: the first on "Double Dislocation of the Jaw of Three Months' Duration." The patient had had puerperal convulsions, and since the convulsions she had been unable to close the jaw. Dr. Mixer describes an apparatus which he devised for reducing such dislocations, which acted admirably. The second article is on the "Operative Treatment of Trifacial Neuralgia." He reports three cases in which he has removed the Gasserian ganglion by the Kransse-Hartley method.

Dr. Elliot reports a successful laparotomy and Kraske operation for absence of rectum in an infant two days old. The author believes his case is the first where a laparotomy was combined with a Kraske operation for the correction of imperforate rectum.

In this volume of the *Transactions* Dr. McFadden Gaston presents an article on an "Improved Method of Exploring the Thorax." His method of making a trap-door opening in the chest-wall is an advance upon methods hitherto adopted.

Dr. Rudolph Matas's article on "The Surgical Peculiarities of the Negro" is a book in itself. It shows the result of many laborious hours, and any one who is interested in the comparative study of the negro race in regard to surgical peculiarities will find it to his advantage to read this interesting article.

Dr. John B. Roberts reports a "Clinical, Pathological, and Experimental Study of Fracture of the Lower End of the Radius, with Displacement of the Carpal Fragment toward the Flexor or Anterior Surface of the Wrist." This article contains a number of photographs, and a skiagraph which clearly shows the deformity which followed an injury to the right wrist.

Dr. De Forest Willard's Röntgen-ray skiagraphs of tubercular knees and knock-knees are very interesting. The skiagraphs of the tubercular knees demonstrate that the use of the Röntgen rays for the purpose of diagnosis and treatment is of the greatest practical value.

This volume ends with a lengthy and interesting report of Dr. S. H. Weeks, who was the delegate to the British Medical Association. This book can be cordially commended to students of surgery, as it contains many new and sound surgical ideas advanced by our leading surgeons.

G. W. S.

PICTORIAL ATLAS OF SKIN DISEASES AND SYPHILITIC AFFECTIONS, in photo-lithochromes from models in the Museum of the Saint Louis Hospital, Paris. By BESNIER, FOURNIER, TENNESON, HALLOPEAU, DU CASTEL FEULARD, and JACQUET; edited by J. J. PRINGLE. Parts X. and XI. London (Rebman Publishing Company) and Philadelphia (W. B. Saunders), 1897.

NOTICE has been taken in the JOURNAL on several occasions of this valuable *Atlas*. The parts before us are entirely up to the high standard of the preceding parts, and comprise "Polymorphous Syphilodermata," by A. Fournier; "Paget's Disease of the Nipple," by J. Darier (an excellent article as well as a fine picture); "Trophic Ulcers of the Hand and Forearm," by L. Jacquet; "Syphilitic Chancre of the Face and Breast," by A. Fournier; "Hydroic Erythema of the Hands and Lips," by Du Castel; "Pigmentary Syphiloderm" (of the side of the neck, and darker than usual), by G. Baudouin; "Molluscum Contagiosum" (of the vulva and thighs), by G. Baudouin; "Vascular Nævus Verrucosus of the Leg" (multiple, and irregularly distributed), by E. Gaucher; and "Pediculosis Vestimentorum with Pigmentation," by L. Jacquet. The list of diseases enumerated shows the scope of the *Atlas*. Some are rare or very rare, while others are common; all are equally well reproduced. The text in some cases is brief; in others lengthy and valuable as a contribution to the subject, as in the article by Darier referred to.

L. A. D.

PROGRESS OF MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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Peronin.—DR. M. EBERSON states that this drug occurs as a dirty-white, bulky, fine powder, without odor, but of bitter taste, with difficulty soluble in cold, but readily in hot water. It is insoluble in acids, concentrated alcohol, and chloroform. Chemically it is benzyl-morphine chloride ($C_{17}H_{15}NO_3.HCl$). Sixteen instances of its use are reported: acute bronchial catarrh, five; chronic bronchial catarrh, three; pulmonary tuberculosis, five; and whooping-cough, three. In general, the results as a cough sedative were favorable. For adults the dose is from one-sixth to one-third of a grain four times daily, in syrup, as a powder, or in tablets or cachets. Its bitter taste should be concealed, and it should be prevented from giving rise to burning sensations in the throat. Its use did not affect the appetite, circulation, or general condition. It diminishes the amount of expectoration, but without hindering its expulsion. On the whole, it appears to be a valuable substitute for morphine. It quickly cures acute bronchitis. It improves the cough-irritation, expectoration, and sleep in chronic bronchitis and pulmonary tuberculosis. It does not injure in any way the digestion. It is not poisonous, even after long-continued use. The only exception to this was found in a two-year old child, who showed drowsiness. Most excellent results were obtained in one instance of hysterical cough, and in three of whooping-cough.—*Therapeutische Monatshefte*, 1897, Heft xi. S. 591.

[For all that this report is favorable, the essential fact at issue is not discussed: how much and in what way is this preferable to other salts of morphine?—R. W. W.]

Creosote Carbonate.—DRS. PAUL JACOB and HANS NORDT present the results of their use of this drug, 103 cases of pulmonary tuberculosis having been under observation. They state that earlier creosote preparations were objectionable from their disturbing the gastro-intestinal tract, diminishing

the appetite and being detrimental to the general condition, while the preparation in question is free from these disadvantages. The dosage began with five drops thrice daily, and gradually increased to twenty-five. The patients received a generous diet. Weighing at regular intervals was insisted upon. Twenty-eight of these histories are given in detail. Of these eleven showed good, sixteen fair, and one no result. For the remainder, some showed marked, and others moderate improvement, in spite of the fact that in some one-half, in others the whole of the treatment was carried out during the fall and winter months, so that climatic influences and out-door exercise as aids to treatment could not be employed. While under treatment colds were infrequently observed, and thus a common cause of failure to improve is measurably removed. In not a single instance was the appetite unfavorably influenced. In five a loss of appetite, brought about by previous treatment, disappeared. In general there was a gain in weight. The cough and expectoration steadily improved, and in most the physical signs were either the same or indicating less involvement of the lung. Whether we believe or not in the specific action of this remedy, it is apparent that it favorably influences the fever and night-sweats, and that it is superior to other preparations in that it does not interfere with but rather favors the nutrition of the patient.—*Charité-Annalen* (Berlin), 1897, S. 159.

[From a more extended experience reported three years ago, we reached substantially the same conclusions.—R. W. W.]

Treatment of the Coryza of Children.—DR. H. NAEGELI-ÅKERBLÖM for the past six years has employed the following method for children, even for nurslings. A 2 per cent. solution of cocaine in equal parts of distilled water and glycerin is made. One drop of this is instilled into each nostril three or four times daily with a medicine-dropper. The immediate result is the opening of the nasal passages, so that the child can readily breathe through the nose and rhinoscopy can be carried out. This method is not dangerous, and the effect can be readily estimated by an investigation of the eyes (pupillary dilatation).—*Therapeutische Wochenschrift*, 1897, No. 57, S. 1311.

Treatment of Epilepsy by the Method of Bechterew.—DOTT. DE CESARE makes use of the following: Adonis vernalis, 15 grains; infused in water, 12 drachms; to this is added potassium bromide, 75 grains; codeine, $\frac{2}{3}$ grain; syrup, 4 drachms; and water, 2½ ounces. One-half of this is taken in the morning, the rest at bedtime. Good results have been obtained upon eight patients during six weeks, in that convulsions ceased in four and the remainder noticed only vertigo.—*Riforma Medica*, 1897, No. 188, p. 447.

The Treatment of Tetanus by Antitetanic Serum.—DR. ED. BOINET reports a single successful instance where ten injections were used. In this instance the germs had preserved their virulence for a long time, even in the dried earth which may cover merchandise coming from warm countries. The bacilli gained entrance through some scratches, the remains of which were then evident, and probably by the respiratory tract as well. Treatment was commenced eight days after the onset of the disease. This treatment is

likely to be more successful when used as a preventive, when the period of incubation is longer and when the progress of the disease is slower. Also the more slowly the tetanus toxin poisons the nervous elements the longer time will the serum have to act, especially if the prompt ablation of the site of infection prevents the absorption and elaboration of the poison of tetanus.—*Bulletin Général de Thérapeutique*, 1897, 10e liv., p. 433.

The Untoward Action of Lactophenin.—DR. ARMIN HUBER reports an instance of a fifty-year old woman who had suffered for many years from hemorrhagic nephritis and commencing cirrhosis. During the past year she had emaciated and had suffered from headaches. During the month just past she had taken seven grains of the drug without the slightest inconvenience. On one day she took four grains in the morning and early in the afternoon seven more. Later she noted a prickly-heat in the head, swelling of the face, and in the evening she experienced a chill, which was followed by fever and a severe headache. The next morning there were erythematous patches, the size of a silver dollar, upon the face, severe swelling of the upper lip, and upon its inner surface vesicles the size of a bean, and bloody ulcerations of the same size. The tongue was enlarged, so that its movements were difficult, and upon its right inferior surface an ulceration which was coated with fibrin. There was severe *factor ex ore*. The vagina burned and itched; on the right *labium minus* was found a small ulcer accompanied by œdematous swelling, and leucorrhœa. This attack produced no change in the urine, neither increasing the blood nor albumin; the quantity and specific and the ulcerations healed without scar. The itching gradually diminished. Gravity were not altered. After eight days convalescence was established. So severe symptoms from lactophenin are rare. Macular exanthemata and icterus have, however, been recorded. The practising physician should keep in mind that "*nil prodest quod non leadere possit idem*" (Ovid).—*Correspondenzblatt für Schweizer Aerzte*, 1897, No. 24, S. 737.

Paraldehyde for Hypodermatic Use.—DR. G. MAURANGE administers from seven to thirty grains of this drug as an hypnotic in certain neuroses (epilepsy, hysteria), in the insomnia of patients suffering from cardiac disease, and in angina pectoris. It is also an antagonist to strychnine and has given good results in tetanus and eclampsia. It formerly gave rise to abscesses (Dujardin and Beaumetz), and possibly the drug was impure. This obstacle has been removed, and pure crystalline paraldehyde can be obtained. If oil is used instead of water as a solvent there are no difficulties in its use. The formula employed is: Paraldehyde, 75 to 150 grains; essence of peppermint, 2 drops; sterilized olive oil, 5 drachms. Of this from one-fourth to one and one-fourth drachms can be given. The remedy is rapidly eliminated by the breath, giving it an unpleasant odor (similar to that of drunkards). The respiration is slowed, the temperature falls, the higher nerve-centres have their congestion removed, and sleep rapidly supervenes, resembling that produced by chloral.—*Les Nouveaux Remèdes*, 1897, No. 22, p. 760.

[The objection to this treatment is not so much to the manner as to the drug. An hypnotic which can be administered hypodermatically is desirable, and we have it in pelletine.—R. W. W.]

The Influence of Digitalis on the Heart-muscle when the Drug is Administered for a Long Period of Time.—DR. H. A. HARE, from observations made upon five pigs to which digitalis was administered, and upon five controls, found on microscopic examination that the ventricular wall was much thicker in the digitalis hearts than in the hearts of those animals which had received no digitalis. In addition, the muscle cut with more resistance, and seemed uniformly firmer. The increase in the left ventricular wall was far greater than in the right. Microscopically it was found that the entire increase was probably due to an increase in the size of the muscular fibres rather than to an increase in their number. In this connection it is of interest to consider for a moment the theory that the pneumogastric nerves, for which digitalis has an especial affinity, are the trophic nerves of the heart; and if this be so it is not hard to understand why digitalis increases the size of the heart-muscle. Whether this trophic influence be exercised or not, it is well known that the effects of this drug upon the heart are such that its muscle-fibre obtains a greater supply of blood with each cycle by reason of the increased force of the systole, the heightened arterial pressure, and the prolonged and increased systole. This research would, therefore, seem to prove that the prolonged use of this drug is capable of producing cardiac hypertrophy in the normal heart, and if this is the case it is fair to assume that when the drug is given to a man suffering with valvular disease, with deficient compensation, it must aid materially in inducing compensatory hypertrophy in addition to any immediate stimulant action which it may exercise on the circulatory apparatus.—*Therapeutic Gazette*, 1897, No. 12, p. 800.

Methylene-blue in Diseases of the Urinary Passages.—DR. G. RICHARD D'AULNAY concludes a paper, in which he presents the results in diseases of the kidneys, bladder, and urethra, with a brief *résumé*: (1) It is an excellent microbicide, (2) it coagulates pus, (3) it prevents fermentation, and (4) it is an excellent analgesic when given internally, and these properties determine its indications in various affections of the urinary system.—*Bulletin Général de Thérapeutique*, 1897, 8e liv., p. 352.

Chelidonine.—DR. HUGO GUTH reports the results of the use of this drug, which is an alkaloid obtained from the *chelidonium majus* and has been offered as a substitute for morphine to relieve pain. Six patients suffering from carcinoma of the stomach, one each from tabes dorsalis, osteomalacia, and arthritis fungosa, received varying doses of the sulphate—from one to six grains daily—without any result.—*Therapeutische Monatshefte*, 1897, Heft 10, S. 515.

Beginning Pulmonary Tuberculosis Treated with Subcutaneous Injections of Koch's Tuberculin.—DR. ELBRIDGE G. CUTLER has treated two patients. The solutions were freshly prepared for each injection according to the printed directions. The injection was invariably given between or below the scapulæ. Each injection was given with an ordinary subcutaneous syringe. This necessitated filling the barrel of the syringe three times for each injection on an average, and the introduction of the needle into a new place each time. There was no abscess produced in the eighty or more

punctures which were made during the treatment of the cases. The only complaint was of a slight soreness in one case in the neighborhood of the injections on about the sixth day of treatment. The injections were also made in three other cases, but as these cases were not suitable for the treatment, from too advanced a stage of the tuberculous process, they have not been included in this report. No constitutional symptoms were observed after the injections in these two cases, nor did the temperature more than once rise as much as one degree Fahrenheit above its usual course. As a rule, the cough and local signs progressively diminished, the amount of the expectoration lessened, and the patient felt progressively better in all the cases in which he has used the remedy, though in the unfit cases (too advanced a stage of disease) emaciation and an extension of the disease kept steadily on.—*Boston Medical and Surgical Journal*, 1897, vol. cxxxvii., p. 571.

DR. J. S. DAURIAC reports his results from sixteen patients observed. With these and others he has administered about two thousand injections; after none (one instance excepted) was there an elevation of temperature. But rarely were local reactions noted at the point of injection, and these were probably due to faulty material or technique. Sometimes after large doses administered in the evening there followed insomnia, nervous agitation, and malaise, lasting for several hours. The fever rapidly diminishes and the sweating disappears, often permanently. The appetite returns, and with it the feeling of *bien-être*, which impresses the patient favorably. With patients who expectorate freely there follows a veritable downpour of sputa in the early part of treatment. Later the expectoration clears up and becomes fluid. Hæmoptysis is favorably influenced and diarrhœa often disappears after some days of treatment. That the results are due to suggestion is denied, for this is insufficient to explain the disappearance of the lesions and of the bacilli, and to account for the increase in weight.—*Le Progrès Médical*, 1897, No. 49, p. 425; No. 50, p. 441.

[It is altogether too early to report definitely as to the value of this remedy. The observers seem to follow the directions laid down by Koch, and their enthusiasm is tempered by the recollections of previous disastrous failures.—R. W. W.]

The Abortive Treatment of Influenza with Calomel.—DR. G. FREUDEN-THAL reports thirty-two instances of the use of this method. The duration of the disease varied from two to six days. For adult males one and one-half grains were given twice; for females, three doses of one grain; for children, without regard to sex, as many sixths of a grain as the child was years old. Within from six to ten hours after the commencement of the treatment the high fever lessened, the head- and backaches were relieved, and the coughing and sneezing were lessened. The change of the drug into sublimate in the organism is believed to be the explanation of the results.—*Therapeutische Monatshefte*, 1897, Heft 10, S. 524.

Kryofin for Influenza.—DR. BRESLER reports sixteen instances of the use of this drug in doses of from seven to fifteen grains, administered in wafers or as a dry powder. The drug is certainly antipyretic, and as well relieves the subjective symptoms without producing any untoward effect, save

in one instance. This was a nervous, weak, spare woman, who, from fifteen grains, developed a cyanosis which lasted a few hours.—*Therapeutische Monatshefte*, 1897, Heft 10, S. 551.

[A limited experience with this drug seems to indicate that, although slow in action, it is safe.—R. W. W.]

The Hot-air Treatment.—DRS. ELLWOOD R. KIRBY and JOSEPH M. O'MALLEY report upon this method, which has been dignified by the title of *thermotherapeia*. They believe that it will find its greatest use in those cases of acute origin, such as sprains, tendinous inflammations, acute muscular strains, acute rheumatic conditions, and as an after-treatment of fractures and dislocations, to promote and aid the elimination of effete substances through the skin, by sweating, and through the lymph-channels, increasing the blood-supply and thereby the nutrition of the part. It is absolutely contraindicated in cases of rheumatoid arthritis, and of but little value in chronic rheumatic affections.—*Therapeutic Gazette*, 1897, No. 11, p. 721.

[We are inclined to indorse these conclusions as correct. The method is not new, and its limitations are well defined.—R. W. W.]

Theobromine in the Treatment of the Asystole of Old Age.—M. E. BARONAKI proceeds as follows: The patient being placed upon an absolute milk diet, he receives thirty drops of the tincture of digitalis each day for four consecutive days. At the end of this time the digitalis is omitted, and he takes seven and one-half grains of theobromine in water every two hours until forty-five grains are taken each day. Diuresis is established within twenty-four hours, the urine often reaching from four to six quarts, and with this the œdema and uræmic symptoms disappear. As soon as this is obtained the drug is stopped, else nausea, vomiting, vertigo, and symptoms of excitement will appear. Next potassium iodide is administered. Should the œdema reappear, the same course is to be pursued. This plan is recommended as a safe one for the asystole of old age.—*Bulletin Général de Thérapeutique*, 1897, 8e liv., p. 380.

The Treatment of Neurasthenia.—DR. WIEDERHOLD believes that the cause of this symptom-complex lies in deficient metabolism in the nervous system, slow blood changes and venous stasis, brought about through insufficient respiration and weak heart-function. As a result, there is an oxygen hunger of the tissues of the nervous system, which should be combated by direct oxygen-inhalation. Especially in pale, obese neurasthenics have good results been obtained. The mouth is disinfected so that *fœtor ex ore* and coated tongue disappear, and the senses of taste and smell improve.—*Therapeutische Monatshefte*, 1897, Heft 10, S. 558.

Diuretics.—DR. JAMES BARR presents an interesting paper, reaching the following conclusions, treating briefly of some of those diseases in which we find it necessary to increase renal activity. The flushing process, so largely adopted at many health resorts, is mainly based on the idea of washing out waste products, ptomaines, and other poisonous substances. The waters from natural springs have no specific properties which do not equally exist

in similar artificial products, and many of the so-called "cures" carried out at mineral springs are nothing more than a gold-extracting process. It is unfortunately too frequently a fact that effete materials retained in the system require to be eliminated, but this can be equally well effected in all countries by an abundant supply of pure mild alkaline water and whey. The fact that so much flushing is so frequently required is evidence that the individual has not been leading a healthy physiological life. Those who imagine that they can preserve their health and longevity by free living, little exercise, and six weeks at a health-resort each year, will in time discover their mistake. It is much more rational to so regulate the diet, exercise, and all the bodily functions that no more work will be required of any organ than it can easily perform. In the treatment of granular kidney the defect is in the power of eliminating solids, and the flushing process carried out by nature is of comparatively little use. The best treatment is to cut off all nitrogenous foods, all alcohol, to live on a purely vegetarian diet, to drink whey and mild alkaline waters, and to regulate the intestinal secretions with an occasional dose of calomel or other mild aperient. Ammonium benzoate will be found an excellent eliminator, especially when there are uræmic symptoms. Other elements in the treatment are warm clothing, moderate exercise, and, if possible, a warm, dry climate. In the venous congestion from cardiac failure we must raise the arterial pressure with cardio-vascular tonics, the best of which are digitalis, caffeine, squill, strophanthus, convallaria, ammonia, and senega. The drugs are often advantageously combined with agents which dilate the renal arterioles, such as sweet spirit of nitre, small doses of nitroglycerin, or sodium nitrite, as thus a larger volume of blood is sent through the kidneys, and the arterial tension is prevented from rising so high as to overpower the heart. In aortic disease, both obstructive and regurgitant, the arterial tension is usually well maintained until the near end, and so we get little or no dropsy unless there be marked cardiac failure, and then our treatment is usually very palliative—rest, mild diet, limited ingestion of fluid, gentle laxatives, and such tonics as strophanthus, caffeine, strychnine, digitalis, and squill. In mitral regurgitation the arterial tension is usually low, arterioles and capillaries large and full, and venous pressure high. Consequently we frequently get much œdema of lower extremities. The treatment is rest, limited supply of fluid (though this is not so imperative as in cases of advanced mitral stenosis), mild laxatives, and digitalis is the drug *par excellence*. In mitral stenosis the arterial tree is small and tension high, so we do not get dropsy until a very late stage. Then the treatment is rest, a light dry diet, calomel or other laxatives, strophanthus, or small doses of digitalis usually combined with strychnine and minute doses of nitroglycerin. Ammonia and squill are often very useful for the accompanying lung mischief. Pulmonic incompetence is a common sequence in cases of mitral stenosis, and the indications for treatment are to lower pulmonic tension and general venous congestion by free purgation and lessening the supply of fluid. A relatively large quantity of blood should be kept in the arterial side by dilating the arterioles with nitroglycerin. In tricuspid regurgitation the lines of treatment are much the same as those of the mitral lesions, with which it is usually associated. When tricuspid stenosis occurs it is accompanied by mitral stenosis in a more advanced stage. The combined lesions

do not render the prognosis more grave, but the tricuspid narrowing gives rise to certain distinctive features of its own, such as high pressure in the veins of the neck, with auricular and ventricular pulsation; the obstruction to the return current from the vena azygos and cardiac veins not infrequently gives rise to pleural and pericardial effusions. In this affection we order light dry diet, moderate exercise, warm climate, little fluid, cholagogues, nitroglycerin, and occasional use of cardio-vascular diuretics. In obstructive lung disease, ammonia, senega, and the saline diuretics are generally useful, and the cardio-vascular tonics are often demanded. In pleurisy and pericarditis the salines are beneficial, but diuretics only take a subsidiary place in treatment. In cirrhosis of the liver, with ascites, there is an obstruction to the entrance of fluid into the systemic vessels, hence the supply should be strictly limited; we should use vasomotor and cardiac tonics, so as to lessen the size of the vessels supplied by the splanchnic nerves, and by raising the arterial tension drive the blood under pressure through the portal system. All alcohol should be stopped, and mild saline purgatives should be given. The best drugs for the vascular system and kidneys are digitalis, strychnine, caffeine, strophanthus. Tapping, although only a palliative process, should be adopted early and as often as necessary, as any rise in the intra-abdominal pressure interferes with the function of the kidneys. A large number of cases of ascites are curable if properly treated. In hysteria and other nervous diseases, accompanied by diminished urine, we can order pure water or whey freely, vasomotor tonics, and saline diuretics. In local cedemas similar treatment is applicable, but purgatives are usually more freely required. If there be a recent thrombus, the free administration of strong solutions of ammonia is necessary to remove the obstruction. In inflammatory affections the potassium salts are especially serviceable. In the dropsy attending acute Bright's disease there is defective elimination of water, with consequent hydræmia, the capillaries are overloaded, and the velocity of blood in them is diminished. In the early stages it is important to combat the inflammation of the kidneys, and for this purpose local or general blood-letting and antimony are the most effectual agents. The quantity of fluid ingested should be regulated by the state of the emunctories. In this form of dropsy the free action of the skin is most important, not so much for removing the dropsy as for relieving the kidneys and getting rid of waste products. The emunctory function of the skin is great, and offers the best substitute for inactive kidneys. The bowels should be at first well unloaded with a good cholagogue purgative, and afterward there should be one free evacuation daily. When the inflammation has subsided and the circulation in the kidneys is restored, we should encourage the free discharge of urine. The best diuretics in these cases are potassium bitartrate, acetate, citrate, and bicarbonate, ammonium benzoate, and, we may also add, sodium and lithium salts. When the dropsy is subsiding, mild alkaline waters and whey may be given in abundance. In obstinate and chronic cases we may use more stimulating diuretics, such as squill, sweet spirit of nitre, juniper, etc. When the heart's power is flagging and the blood requires more motion imparted, then digitalis, caffeine, and strophanthus are demanded. Of course, the diet should be non-nitrogenous, and the patient kept warmly clothed. In conclusion, diuretics are mere adjuncts to treatment; there is

no disease or process of disease treated purely and simply by their use. The number of valuable diuretics in the *Pharmacopæia*, or outside of it, is extremely limited. If you attend to the indications for their employment, you will have no difficulty in selecting from the limited number the suitable diuretics for use in any particular case. You will not infrequently find your art baffled, which may make you try something new, only to find that it is not a true diuretic; but whatever drugs you employ, administer them with a strong infusion of common sense from which all credulity has been eliminated.—*British Medical Journal*, 1897, No. 1928, p. 1697.

MEDICINE.

UNDER THE CHARGE OF

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Bacteriology and Pathology of Sero-fibrinous Pleurisy.—LE DAMANY (*La Presse Médicale*, November 24, 1897, p. 329) concludes from his researches on the bacteriology and pathology of sero-fibrinous pleuritis:

1. That sero-fibrinous pleuritis, where the effusion contains micro-organisms other than the bacilli of Koch, are not due to the action of these micro-organisms on the pleura.

2. That the pleurisy may be primary; in this case it is always tuberculous. The presence of ordinary micro-organisms in the effusion is accidental, and their discovery cannot be used as an indication of the nature of the pleural inflammation.

3. The pleurisy may be secondary and non-tuberculous. Then the pleural inflammation arises by the extension of a pulmonary lesion or by a sort of collateral fluxion. The cause of the effusion is in the lung (infarct, congestion, hepatization). Whether the pulmonary lesion is aseptic or infectious, the presence of the microbes in the pleuritic fluid is still accidental and exceptional.

4. There is but one idiopathic sero-fibrinous pleurisy—it is the tuberculous pleurisy. The other sero-fibrinous effusions are symptomatic of a concomitant pulmonary lesion, which they never outlast.

He studied eighty-two cases of pleurisy, which he divided into two groups:

1. Fifty-five primary pleuritis, in all but four of which the pathogenic action of Koch's bacillus was demonstrated. Eleven occurred in patients with outspoken tuberculosis, of which two died of an acute miliary spread; one post-traumatic case; one in a case of nephritis; one in an individual with aneurism of the aorta; one in the course of progressive pernicious anemia; one in a case of heart disease. All these pleuritis were tuberculous.

2. Non-tuberculous pleuritis, of which there were eleven. Four of these

were in association with pneumonia; three in rheumatism with cardiac complications; three in cases of cancer.

In carrying out his investigations no new methods were used, but great care was used in the clinical examinations, cultures, inoculations, and pathological study.

The inoculation experiments were made on guinea-pigs. As large quantities of the fluid as possible were injected into the peritoneal cavity of the animal. He has injected into the peritoneum of a single guinea-pig as much as 300 c.c. of pleuritic fluid in weekly doses of 10 to 50 c.c., according to its toxicity.

He thus inoculated fifty-five pleuritic fluids, and produced tuberculosis in the animal in forty-seven instances. In eight instances negative results were obtained, the greater part of which were to be attributed to inoculation with insufficient doses. Among these eight negative results four were from cases with sero-fibrinous pleurisy without other micro-organisms or culture, pleurisies coming on in individuals having outspoken tuberculosis of the apices. It seemed fair to assume that these cases were tuberculous. One of the four pleurisies remaining had obstinate symptoms, large relapsing effusion without ordinary micro-organisms, and the clinicians believed the case to be one of tuberculous pleurisy. Only 10 c.c. of fluid were inoculated from another case, so that the negative result is without much value. In a third case he inoculated but 20 c.c., and in a fourth 50 c.c. of fresh pleuritic fluid.

These results show that it is generally possible to demonstrate the presence of tubercle bacilli in the fluid of primary sero-fibrinous pleurisies by this method of inoculation. In fact, tubercle bacilli were demonstrated in practically seven out of every eight cases of primary pleurisy. If to the forty-seven positive cases the four negative, which were undoubtedly tuberculous, are added, Le Damany's results showed 92 per cent. of the fifty-five cases of primary pleurisy to be tuberculous.

Culture methods, he believes, lead many observers astray. He holds that it is a mistake to conclude from the development alone of a parasite in cultures from a pleuritic fluid that this micro-organism is the pathogenic agent of the pleurisy. He obtained in eighty cultures from pleuritic fluid but eight positive results in aerobic cultures. Anaerobic cultures had always given negative results. Sixty-eight of these pleurisies were primary or came on in the course of pulmonary tuberculosis (eleven cases). From these cases there were obtained seven positive results.

When compared with the inoculation experiments, these culture results are interesting. Among the organisms found in the cultures were the pneumococcus, staphylococcus albus, micrococcus tetragonus, and bacterium coli communis. The inoculation of the pleuritic fluid from these same cases produced tuberculosis in the inoculated animal. The writer thus believes that these organisms play an unimportant rôle in such cases, and he thinks they are conveyed to the pleura by phagocytes.

The pathological study of sero-fibrinous primary or secondary pleurisies enables one to divide them into two large groups:

1. The primary or tuberculous pleurisies.
2. The secondary or non-tuberculous pleurisies.

The evolution of primary tuberculous pleurisy goes through three stages:

a first, corresponding to the formation of a new-formed tuberculous membrane on the surface of the pleura; a second, characterized by the development of the effusion and the arrest of the pleural tuberculosis, is favorable, the effusion in moderate amounts being a conservative factor; a third, marked by the absorption of the serous fluid and the organization of the fibrinous false membrane which covers the new-formed membrane, cannot be absorbed, and is very thick toward the inferior part of the pleura.

The pathogenesis of secondary, non-tuberculous, sero-fibrinous pleurisy is not more complex than in the primary tuberculous form. Omitting those due to cancer, these are practically always due to a pulmonary lesion. These result from pulmonary infarcts or from subpleural pulmonary hepatization. These pleurisy are not due to the pneumococcus, since it is rarely found in cultures or by inoculation of mice. Pneumococcus pleurisy are nearly always purulent.

In *résumé*, there is but one sero-fibrinous primary pleurisy, according to Le Damany, namely, tuberculous pleurisy. It alone is due to the penetration of a micro-organism into the pleura. It is the only form in which the effusion contains more or less constantly the pathogenic agent—the bacillus of Koch. It is, then, the only one in which the fluid, normally, is not sterile. The ordinary micro-organisms which are found exceptionally in these primary pleurisy play no rôle so long as they do not become purulent; their presence is purely accidental.

Glycosuria in Primary Cancer of the Pancreas.—BARD and PIC (*Revue de Médecine*, December 10, 1897, No. 12, p. 929) discuss this interesting question again, after having published a memoir on it in the same journal in 1888. In their earlier communication they asserted that the symptoms of pancreatic cancer were quite characteristic and could be classified into two groups. In one group the symptoms were positive: occurrence of emaciation and rapid cachexia, icteric bronzing, distention of the gall-bladder, sometimes pain, and a tumor in the epigastrium; in the other, negative: absence of swelling of the liver and spleen, absence of ascites. To these symptoms Hanot had applied the term the “Bard-Pic syndrome.” Other symptoms, such as steatorrhœa, lipuria, and glycosuria, considered of first importance by some observers, Bard and Pic held were not cardinal symptoms of the disease. The importance of distention of the gall-bladder in cancer of the pancreas, in contrast to its contracted state, usually observed in icterus due to gall-stone obstruction, had been emphasized by other observers.

Some clinicians, among them Litten and Laehmann, consider that glycosuria is of the greatest value in the diagnosis of pancreatic cancer. Bard and Pic failed to find sugar in the urine in any of the seven cases which they reported in their first paper, and Parisot and Caron regard glycosuria as a rare symptom.

Mirallié, recognizing this difference of opinion, collected in 1892 all the cases of primary cancer of the pancreas he could find in the literature, and analyzed them with especial reference to the frequency of the occurrence of glycosuria. He collected 113 cases in all; in fifty of the cases it was definitely stated that sugar was searched for in the urine, and in thirteen of these it was found present. An alimentary glycosuria was present in two of the

remaining thirty-seven cases. From the study of each of these thirteen cases, Mirallié found that in the majority of instances glycosuria had been absent for as long as eleven months before the termination of the disease. He concluded that in the evolution of cancer of the pancreas there are two distinct periods—an early glycosuric and a later non-glycosuric.

Bard and Pic express some doubt as to whether glycosuria occurs even as commonly in the early stages of the disease as Mirallié would lead one to believe, because all their seven cases which they reported came under observation between seven weeks and six months of the onset of the symptoms. They state that the importance of glycosuria as a symptom of primary cancer of the pancreas has passed through three phases: At an early period glycosuria was considered a common symptom and an important one in the diagnosis of the disease; in the second period, which corresponded with their memoir published in 1888, its diagnostic value was not considered of much importance; in the third period, inaugurated by Mirallié, a new importance was assigned to glycosuria in the evolution of cancer of the gland, in that it was present during the early stages and absent during the later stages of the disease.

The writers now take up the question again in this article, with the object in view of ascertaining more definitely the actual frequency of glycosuria in primary pancreatic cancer, and also of explaining some of the phenomena in connection with it. They state that from their personal observations, and from the study of the cases related in the literature with sufficient detail from which to draw conclusions, it is possible to divide the cases of glycosuria into two definite groups: first, those where there was simple glycosuria, and secondly, those in which the glycosuria was associated with definite clinical symptoms of true diabetes.

They then report at length personal observations on two fatal cases coming under the first category and on which autopsies were obtained. The point of interest on which they dwell was the occurrence of sclerosis of the pancreas and a cirrhosis of the liver running parallel one to the other, the former being due to obstruction by pressure of the duct of Wirsung and the latter of the ductus choledochus. It is to this sclerosis of the pancreas and not to the effect of the cancer that Bard and Pic attribute the glycosuria. Seven of Mirallié's cases belonged to this group.

The cases of primary cancer of the pancreas associated with glycosuria and true diabetic symptoms are then taken up. The writers do not give notes of any personal observations, but they review the cases published in the literature belonging to this group. Four of Mirallié's cases were cases of glycosuria with clinical symptoms of diabetes. After reviewing these cases and some others published after Mirallié's communication, Bard and Pic are led to believe that some of them were instances in which the diabetes antedated the appearance of the pancreatic cancer, and hence that the former was entirely independent of the latter. This would then tend to diminish the percentage of the cases of glycosuria actually due to cancer of the pancreas. They have been able to collect from the literature, since the publication of Mirallié, thirty-seven new observations on primary pancreatic cancer. In only four of these was glycosuria present. In other words, up to the time of publication, 150 cases of primary cancer of the pancreas had been recorded

in the literature, with only seventeen instances in which it had been stated that glycosuria was present. In many of the cases no mention of a urinary examination is made, so that it is possible that sugar may have been present and had not been observed. It is thus possible that the number of cases of glycosuria may be greater than seventeen. On the other hand, Bard and Pic believe that in some of the cases recorded the diabetes was primary, which would leave really a smaller number that could be definitely attributed to cancer of the pancreas.

These observers explain in a very interesting way the disappearance of glycosuria and the diabetic symptoms observed in many of the recorded cases. They claim that the glycosuria in the early stages is due not to the direct effect of the cancer, but to the sclerosis of the gland produced by pressure of the tumor on the excretory duct. They support Lépine in his view that pancreatic diabetes is due to the suppression of an internal glycolytic ferment which enters the general circulation under normal conditions. The explanation they suggest for the disappearance of the glycosuria in the late stages is, that the cancer-cells take on not only the histological characters of the pancreatic cells, but also their physiological function of producing the glycolytic ferment, which in the early stages of the disease is diminished or absent, owing to sclerosis of the gland-tissue. This restoration of the glycolytic ferment leads to the normal transformation of the carbohydrates and the consequent disappearance of the glycosuria.

Scarlatinal Albuminuria.—DITTMAR (*Glasgow Medical Journal*, December, 1897, p. 426) publishes the results of his observations on the urine of ninety-one consecutive cases of scarlet fever admitted to the wards of the City of Glasgow Fever Hospital during a period of six months. The patients varied in age from one year and two months to fifty years, the majority, 84.6 per cent., being under fifteen years, and 62.6 per cent. being under ten years of age.

At least two specimens of urine from each patient, voided about 6 A.M. and 6 P.M., were examined daily. In some cases as many as three or four specimens from each patient were daily analyzed, and in all over ten thousand specimens were examined for albumin and hæmoglobin. Most of the cases remained in the hospital for fifty-six days.

Albumin or blood-coloring matter, or both, were detected at some period during the stay in the hospital in forty-eight (52.7 per cent.) of the cases examined, and of these twenty-nine (60.4 per cent.) were under ten and thirty-nine (81.2 per cent.) under fifteen years of age. In most of the cases the quantity of albumin was small, and could be detected only by careful testing. In some cases merely an occasional trace was detected; but in others the albumin persisted in the urine for weeks, and was sometimes very considerable in amount. In some of the cases "blood" alone seemed to be present, the albumin bearing, as far as it was possible to judge, a proportion to the hæmoglobin such as exists in normal blood. In other cases both blood and albumin were found, the amount of albumin being out of all proportion to the hæmoglobin as it exists in normal blood.

There was no particular date on which albumin seemed particularly prone to appear, although a relatively larger number of the cases showed the pres-

ence of an abnormal constituent during the latter half of the first week, during the second week (ninth to the twelfth days), and on the thirty-first day than at any other period of the illness. The cases seemed to divide themselves into two groups: (1) Cases of "early" albuminuria, and (2) cases of "late" albuminuria. Twelve of the cases came under the heading of "early" albuminuria. In nine of these twelve cases the albumin disappeared only to reappear again later in the disease, the interval during which the urine was free from albumin varying in these cases from three to forty-eight days.

Mahomed claims that in some cases of nephritis, notably in scarlet fever, one sometimes observes a stage in which only blood-coloring matter can be detected in the urine. This stage he terms the "pre-albuminuric stage." The explanation advanced was that early in the disease there is observed a condition of high tension in the arterial system, which, if sufficiently severe, leads to transudation of hæmoglobin before the appearance of albumin in the urine. A similar but converse phenomenon is sometimes observed during the decline of a nephritis, the albumin disappearing first, the hæmoglobin later. Dr. Thomson has suggested the term "post-albuminuric" stage for this period. Dittmar was not able to confirm these observations in the study of his cases.

The conclusions that Dittmar arrives at are as follows:

1. That albuminuria or hæmaturia, or both, occurred in 52.7 per cent. of the cases observed.
2. That the cases seemed to divide themselves naturally into three classes: (a) Those of pure albuminuria in which albumin only was detected; (b) those of hæmaturia, in which "blood" seemed to be present; (c) those of albuminuria and hæmaturia, the albumin being greatly in excess of the hæmoglobin as found in the blood.
3. That dropsy or œdema of the superficial parts was observed unmistakably in only three of the cases.
4. That a "pre-albuminuric" and a "post-albuminuric" stage (if the word be allowed) do not exist in the proper sense of the terms.
5. That a pulse of "high" tension was not an invariable accompaniment even of undoubted nephritis.

The Smegma Bacillus.—Important additions to our knowledge of the smegma bacillus have been made by CZAPLEWSKI and LASER (*Munch. med. Woch.*, 1897, No. 43). These observers have been able to cultivate the organisms. Czaplewski used nutrose-scrum-agar; Laser used agar smeared with human blood. The colonies grow rapidly, resembling those of streptococci or diphtheria bacilli. The tenacity with which the bacilli resist acids in decolorizing was preserved in the cultures, proving that the resistance is not due to fat from the medium, but to some other cause. Laser was unable to discover any pathogenic action in white mice and guinea-pigs. The practical importance of these investigations, if confirmed, is very great. Within twenty-four hours a culture can be obtained. The appearance of the colonies and the peculiar staining reactions, combined with the rapid growth, make it easy to distinguish the organisms from others, so that inoculations, requiring as they do so much more time, will no longer be necessary.

The Sputum in Cancer of the Lung.—HAMPELN (*Zeitschrift für klin. Med.*, Bd. xxxii., p. 247) gives the results of a rather rich experience. He agrees with former writers that the hemorrhagic character of the sputum is important, though he claims there is no characteristic tint. Moderate and temporary hemorrhages are more likely to be encountered, though in rare cases the bleeding is prolonged—to two months in one case—and copious. As to the microscopic characteristics of the sputum, it has heretofore been held that only the finding of actual bits of broken-down new-growths is of diagnostic value, yet such bits have been rarely found, only once among the authors cited. Hampeln has made careful comparative examinations of the cells found in the sputum in various diseases. He holds that the normal, non-pigmented polygonal cells of the alveoli occur so rarely, if at all, in sputum, that they do not play a great part in differential diagnosis. When in disease cells are found which plainly differ from the ordinary pavement and cylinder cells of the mouth or air-passages—cells which are non-pigmented, polymorphous, polygonal, of various sizes, sometimes gigantic, with plain nucleus and nucleolus, single or in masses—the diagnosis of new-growth is permissible. The seat or origin of the growth cannot be determined from the character of the cells, so that a distinction between bronchial and pulmonary cancer is not possible. A number of illustrations of cells of various kinds, including some from cases of cancer, add to the value of the article. It is interesting because it shows the reaction against the idea long prevailing, that there is nothing diagnostic about the cells of new-growths. That these are not specific in shape, as was once thought, is, of course, admitted by the author; yet there are many details of size, shape, character of nucleus, and staining properties that, when considered in relation to their source, may enable an experienced observer to draw conclusions of value.

Mucus in Stools.—ADOLF SCHMIDT, who has done such useful work in the application of staining-methods to mucus in sputum, has made a valuable contribution to the present subject, one that is all the more important because the examination of feces is strangely neglected by many. Although the result of the present work may seem trifling, yet it includes a revision of many points that were long thought to be settled, but in fact were not. The details are indispensable to clinical investigators, but it will suffice here to give some of the author's conclusions. The conception of a special disease, enteritis membranacea, cannot be based on the quantity and shape of mucus in the stools. The clinical picture described by Nothnagel under the name of colica mucosa may, however, be separated from other forms of enteritis.

The basis of most membranous bodies in feces is mucin. The refractoriness of these masses is due to the constant presence of fats and soaps in considerable quantity. Fibrin has never been positively demonstrated in the mucous discharges. The number of round cells in intestinal mucous is not always so small as might be supposed from the examinations of fresh preparations. For the diagnosis of ulcerative processes, the absence of mucus among the cells is more important than the appearance of large numbers of round cells. We have at present no certain guides to the sources of mucus or the cells in the mucus. The strongest evidence of a source in the small intestine is the digestion of the cell bodies, leaving the nuclei free. Except

in case of very rapid transit through the intestine, mucus never passes undissolved from the small intestine to the anus.—*Zeitschrift für klin. Med.*, Bd. xxxii., p. 260.

Bacteriuria.—R. BARLOW (*Deutsches Archiv für klin. Med.*, Bd. lix., p. 347) has gathered together from the literature and his own experience notes on sixty-five cases of bacteriuria. In these sarcinæ were present in twenty-two cases; colon bacilli nineteen times—seventeen in pure culture, twice with staphylococci; the latter alone in three cases; in one each an H_2S -forming bacillus and an undetermined bacillus. With regard to the source of the bacteria, it is interesting to note that, although albumin has been noted in some cases, there is an important error in such determinations, since the heat and nitric-acid test gives an opacity in bacteriuria sometimes when other albumin tests fail. In no cases have casts been found, unless there was a complicating nephritis or heart disease. The renal origin is, therefore, not yet demonstrated. The theory of Posner, that the bacteria come from the intestines, is not looked on favorably by the author. His objection is based on the negative results of the bacteriological examination of the blood, the sterility of the pelvis of the kidney in a case of Krogius, the absence of turbidity in the urine as it comes from the ureters, and the absence of signs of intestinal putrefaction in the urine. That the bacteria come from the urethra is negatived by the large number of coli infections and the relative scarcity of staphylococci, in marked contrast to the relative frequency of these forms in the urethra. Barlow inclines to the belief that the infection often takes place by means of lesions of the intestine, citing such lesions as fissures or lacerations of the anus, fistula *in ano*, and even severe massage of the prostate and seminal vesicles through the rectum.

Even more difficult to explain than the source of the urinary infection is its seat. In a case of Goldenberg's the bacteria seemed to come from the seminal vesicles, but in general we are completely ignorant of the seat of reproduction of the bacteria. They certainly do not live only in the bladder, or the difficulty of removing the condition would be much less than it is. As to the symptoms, the urine is always turbid, opalescent, and looks, especially when shaken, as if fine powder were suspended in it. Colon bacilli usually cause a fetid odor. The reaction is acid, alkaline, or neutral. In rare cases the urine is ammoniacal. On standing, a sediment usually forms, consisting exclusively of bacteria and mucus. The supernatant fluid, however, does not clear, but may become more turbid. Albumin, and at times sugar, may be present. Subjective symptoms may be absent, or there may be local symptoms of variable severity, from tickling in the urethra to severe irritation and shooting pains, and even malaise, fever, enlarged spleen, and chills.

The diagnosis is easy, if the urine is passed in several portions and the examinations made at once. Prognosis is not altogether favorable. Remissions are frequent, and the disease may last for years (fifteen in a case of Finlayson).

The treatment should be antiseptic, salol internally, and silver nitrate or argonin locally, being very useful. Disease of urethra, prostate, and seminal vesicles must be considered.

SURGERY.

 UNDER THE CHARGE OF

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A Case of Wandering Œdema.—MASTERMAN (*British Medical Journal*, April 3, 1897) reports an interesting case of œdema which he considers to have been probably due to septic infection. The patient was a boy, aged eight years; the œdema first made its appearance after a period of pain in the left leg, which became very much swollen and tense, with purpuric patches, irregular and raised. The left arm was next involved, and then the head; both upper eyelids were intensely œdematous; also the area between the eyes and over the temples. The pulse was slightly quickened and the temperature was a little over 100° F.; its highest point was 101.2° F. The lower eyelids, ears, and occipital regions were next involved. Then followed an œdema of the right arm, then of the back, the œdemas disappearing in the same order in which they made their appearance, the vesicles becoming purulent and then drying up.

The attack was closed by a severe acute dysentery. Blood and matter were very copious and tenesmus severe.

The treatment employed was quinine internally, extract of belladonna with glycerin externally and later lotio plumbi eum opio.

External Pharyngotomy for Epithelioma.—MORTON (*British Medical Journal*, March 27, 1897) reports a case of epithelioma of the tongue which involved the right tonsil and floor of the mouth and in which he removed, by an operation similar to Kocher's method for excision of the tongue, the tonsil, floor of the mouth, and half of the tongue. The patient made a complete recovery, and there was no sign of return six months after the operation.

The author did not ligate the external carotid artery; he divided and turned apart the divided portions of the lower jaw, so as to give free access to the tonsillar region for the purpose of dealing readily with all bleeding vessels.

The patient was fed by a tube passed into the stomach, which was left in position; attempts at swallowing were thus avoided, and no food got into the mouth; moreover, the patient began at once to take large quantities of nourishment.

The patient was tracheotomized prior to the operation and the pharynx packed with sponges. The tracheotomy tube was retained for ten days and

the stomach tube for rather more than a month, but by firmly plugging the external opening into the pharynx he could swallow three weeks after operation.

Cholecystitis and Infections Angiocholitis due to Coli Bacillus—Cholecystotomy—Recovery.—LEJARS (*Gaz. Heb. de Med. et de la Chir.*, March 25, 1897) reports an interesting case of infection of the biliary passages by the coli bacillus.

He says we have to do in this case with a coli bacillus infection, without lithiasis of the gall-bladder and of the larger subhepatic ducts, and this infection has made itself manifest for two years by painful and febrile crises, which have latterly become more and more frequent. In addition the intervention took place during an acute attack, more acute and more severe than any of those previous, and had for its purpose the relief of symptoms typhoidal in nature and menacing a general septic nature.

The immediate relief produced by the cholecystotomy and drainage of the bladder was shown in the evening fall of temperature.

The case admirably demonstrated the results which such an intervention, so simple in its nature, affords. It also provided a method not only for the relief, but also for the cure of a chronic condition which had resisted all other forms of treatment.

A Case of Subphrenic Abscess followed by Empyema Successfully Treated.—McNAUGHT (*British Medical Journal*, May 22, 1897) reports the following interesting case:

A well-nourished man, aged thirty-three years, was seized with severe epigastric pain and vomiting. His previous history showed dyspepsia, but no hæmatemesis. Morphine relieved the pain, and no further vomiting occurred.

Ten days later he had a severe, catching pain at the lower angle of the scapula. Coarse friction-sounds were audible at that point. There was a short cough, but no expectoration. Temperature 101° F., pulse 114. As there had been no exposure, the author suspected a rupture of the stomach and the formation of a subdiaphragmatic abscess. There were no signs of general peritonitis. Two days later a displacement of the lower border of the diaphragm was noted throughout its entire extent. The usual liver-dulness was replaced by tympanites, which extended from the lower costal margin as far upward as the nipple and as far back as the anterior axillary line. At the right base there was marked dulness extending from the inferior angle of the scapula, and this dulness was bounded anteriorly by a curved line running steeply down from the posterior axillary line to the costal margin. Breath-sounds were entirely absent over this area. Above the tympanitic area in front, and extending in a band two inches wide transversely along the nipple line from the sternum along the ribs to the back, there was also marked dulness. Above this the lung was resonant, and auscultation discovered moist râles. Dyspnoea was considerable, but there was very little expectoration or cough.

Forty-eight hours later the tympanitic area had increased, and splashing sounds could be heard entirely distinct from the stomach, whose tympanitic

area was also easily differentiated. A hypodermic needle drew fetid pus between the ninth and tenth ribs in the posterior axillary line, and an incision drew off a large amount of pus and gas. Serum was found in the pleura. The abscess-cavity was washed daily and drained. Pus was evacuated by aspiration after a fortnight from the pleural sac. It was, however, sweet. Resection of a rib was finally necessary, and after drainage and packing it healed.

The previous history leads the author to believe that the abscess was due to a small rupture of the stomach or duodenum, as the abscess-formation was slow. The amount of gas and the distention made the diagnosis easier.

In another case he would open the subphrenic cavity between the eighth and ninth ribs, and use siphon drainage earlier in the pleural cavity.

Chronic Prostatitis and Sexual Neurasthenia.—In discussing the relation of these diseases HORTINGER (*Correspondenzblatt für Sch. Aertzt.*, 1896, No. 6) says that many functional derangements of the genito-urinary system, which have been called purely nervous or symptoms of neurasthenia, have as their pathological and anatomical basis a chronic or other form of prostatitis, and that the so-called neurasthenia disappears as soon as this pathological condition has been cured. If these cases were only recognized early and treated properly, there would be a great diminution in the number of neurasthenic patients. A greater decrease, however, the author believes would follow the stamping out of gonorrhœa and the education of the public in the physiology of the sexual organs.

As a case in point, the author details the history of a patient who had had loss of power for four years and had detected the presence of semen in the urine for two years and a half. At the same time he had decreasing strength and loss of appetite and digestion. He had been treated for various diagnoses without avail. The microscopical examination of the urine disclosed the fact that there existed a prostatitis. The prostate was but slightly enlarged, was somewhat harder, but not especially tender; the expressed secretion showed a large number of leucocytes, some red blood-corpuscles, and spermatozon.

Treatment *per urethram* and by drugs *per rectum* produced no results, and the patient did not begin to improve until massage of the prostate was carefully and systematically carried out. The patient improved rapidly and was cured, and was seen in perfect health two years after the time of his discharge.

Foci of Suppuration at a Distance from the Appendix in Cases of Appendicitis.—PIARD (*Arch. gén. de Méd.*, November, 1896), after considering the etiology, pathology, and symptomatology of these abscesses, considers their treatment and the indications for operation.

In considering the question of the removal of the appendix, he says that to insist upon the removal of the appendix in these cases at all hazards would be to increase markedly the gravity of the intervention. The indications are in some cases absolute, in others relative. In the presence of suppuration situated at a distance from the appendix, he says the indication for removal is only absolute in the following cases: — — —

1. When a perforating appendicitis has produced a cystic peritonitis of multiple foci.

2. When the inflamed appendix threatens to become the origin of a general septicæmia.

3. When the appendix keeps up and renews the infection in the foci at a distance.

In all other cases the resection of the appendix is less urgent.

The author makes the following *résumé* of his study of this subject:

1. Abscesses are observed at a distance from the primary focus of infection in cases of appendicitis.

2. They are situated in various regions, some of which are the iliac cellular tissue, the peritoneal cavity, in the anterior abdominal parietes, in the liver, in the pleura, in the lung, and in various organs situated at greater distances, as the brain, parotid glands, kidney, and spleen.

3. These abscesses are peculiar in that they do not infect surrounding tissues even when at a distance from the appendix, and are thus readily differentiated from periappendicular abscesses in abnormal situations, due to a vicious situation of the appendix.

4. These abscesses are the expression of a diffuse appendicular infection produced by means of a peritoneal contamination, sometimes through the channel of the vascular system of the appendix by its connections, physiological or pathological.

5. They present in their variety all the transitional stages between a local inflammatory process and general septicæmia. They permit us to conceive of a new chapter to add to the autoinfections of internal origin.

6. These abscesses are rare. Their recognition will result in a more precise knowledge of the indications for operation in the surgical treatment of appendicitis.

Silver Salts as Antiseptics.—CREDE (*Cent. für Chir.*, October 24, 1896) published a monograph upon this subject in May. The results he obtained have been confirmed by his own and his assistants' observations since that time, and by over one hundred of his surgical colleagues who have used these antiseptics since then. He believes that, though the antiseptic method may not be as near the ideal as the aseptic, it is more practical in the majority of cases. This is not because he believes the results that can be obtained by strict asepsis are not so good, but because as good results may be obtained in a simpler manner, in less time, with less labor, and at less cost.

The ordinary preparation of the hands and the employment of dressings, aprons, dishes, etc., that are not sterilized, but are made antiseptic, save time and labor. Only the instruments are boiled. Thus much labor is saved, as also in the changing of dressings, as these are smaller and simpler than the aseptic. The small amount of dressing is very marked, and makes a material difference in the total expenses of the year. The security of the silver salts as antiseptics lies in the fact that they are mild but energetic antiseptics. Germs are destroyed by them of which asepsis cannot take note, and they are more efficient than other forms of antiseptics.

The method which he has employed for nearly a year is the following: wounds which the surgeon makes are covered, whether they are sutured or

not, with a dressing of silver gauze; occasionally the line of incision is strewn once with a powder, itrol (arg. citric.), to prevent more surely a secondary infection of the wound; over this is placed silver gauze, which contains, in fine powder, metallic silver; it is absolutely non-irritant, and can be sterilized, although this is unnecessary; it becomes antiseptic just as soon as pathogenic micro-organisms develop in the wound, since the lactic acid which they produce forms with the silver a combination which is an energetic germinicide.

In old wounds, after a thorough cleansing of the surrounding skin, the wound and surroundings are washed with a 1 to 2000 bichloride or a 1 to 5000 silver solution. Dependent tissue is removed and large undermined areas are laid open; smaller crevasses and joint-surfaces are left alone, and the surface of the wound is powdered over lightly with itrol. If inflammatory processes have resulted, he applies a wet antiseptic dressing for a few days; and when no reaction is visible he applies silver gauze, then cotton, and places the part at rest by a bandage and fixation. When the dressing becomes partly soaked with blood and serum he attempts to dry the dressing or reinforces it with cotton. When the secretion is very great he changes the entire dressing. The contact of the secretion with the air is of no moment, as the wound is securely protected from infection. If pathogenic micro-organisms had already found entrance into the deeper tissues, they can but produce an abscess, which is treated as such. The dressing, when it remains dry, is changed for the first time on the fifth to the tenth day. No eczema or argyria has ever been observed from the use of this antiseptic dressing.

Aetol (arg. lactic.) and itrol (arg. citric.) are the two forms of this silver antiseptic which can be obtained in powder or tablet form suitably prepared for making standard solutions. Silver gauze can also be had, and the author warns the profession that there are certain preparations which are not of proper strength or stability, while those which he employs are stable in any climate and for any length of time. They should be kept, however, away from the light, or their efficiency will be slightly affected after a lapse of some time.

The stains produced by the silver may be removed by placing them for a few minutes in the following solution: 1 part sublimate, 2000 parts of water, 25 parts of salt.

Resection of the Superior Maxilla.—WILDT (*Centralblatt für Chirurgie*, 1897, No. 18) describes a new osteoplastic method, by Bardenheuer, for the closure of the palate defect after excision of the superior maxilla. The flap is made from the nasal septum in the following manner: The ordinary incision is made, except that it is directly in the median line, through the upper lip, and then up through the median line of the nose, with a lateral incision carried beneath the eye in the ordinary manner. After the formal resection of the maxilla has been performed, the osteo-mucoid flap is formed by cutting through the nasal septum, just above the osteo-cartilaginous junction, with cutting-forceps, the incision being carried in a curve backward and downward to the hard palate. An incision is then made parallel to the bridge of the nose from the anterior end of the upper cut down to the hard palate, an eighth of an inch from the anterior border of the septum. The flap is now free on all but its inferior margin, where it is attached to the

hard palate. This attachment is now divided for one-third of its breadth to make certain that the flap breaks at the desired level. The flap is now gradually bent down by first introducing one and then two fingers behind it; its posterior border is united to the soft palate, while its anterior and upper border is attached to the mucous membrane and muscles of the upper lip and cheek.

The advantages gained are manifest. There is a complete separation of the nasal from the oral cavity. Speech and swallowing are facilitated, and it is possible to remove much more of the diseased or suspected mucous membrane, and consequently recurrence is less liable to occur.

Catgut or silk sutures are employed. There is comparatively little bleeding more than in the ordinary operation, and the closure of the wound is the same in all other respects.

A Case of Brain-cyst with Jacksonian Epilepsy; Operation followed by Relief.—CABOT (*Boston Medical and Surgical Journal*, June 3, 1897) reports a very interesting case in which the gradual onset of the symptoms was well marked and carefully studied by an intelligent patient.

The history was that of a disturbance of nerve function beginning two years before, and at first only affecting the leg-centre at the upper part of the fissure of Rolando. Gradually the irritation extended down along the fissure of Rolando to the centres of the abdomen, shoulder, arm, and face. The degree of functional interference with these centres was also gradually increasing, until he had a temporary paresis of the muscles following each attack. As the irritation reached the shoulder-centre it had attained a sufficient degree of intensity to affect the sensorium, and led to a general convulsion.

It was necessary to consider the possibility of tumor, including cyst, tubercle, and gumma, and also of some degenerative changes in some way connected with the old injury to the cranium, which was a blow by a heavy stick twelve years previously, either through the irritation caused by a depressed spicula of bone, by an adhesion of the membranes, or by some change originating in an injury of the brain substance itself.

The absence of severe pain so characteristic of the invasion of the brain tissue by a tumor, and the slow development of the symptoms, led him to regard the gliomatous or sarcomatous tumor improbable. The history did not point to a gumma or tubercular tumor. On the other hand, the history of the injury to the head was so clear as to lead to it in seeking a cause for the symptoms. With so exact a location it was determined to operate.

The operation was done in two stages. An osteo-cutaneous flap was formed, and then, five days later, the dura was opened; the brain bulged, and did not have a normal pulsation. It was also noticed that the cortical portion of the brain had a yellowish color toward the upper part of the opening. Stimulation of this area produced no result, and it was only by stimulation anterior to this area that motion in the arm could be induced. The yellow area was punctured, and brownish serum escaped. The cyst was opened. It was the size of a pullet's egg, with a very thin wall and no connection at any part with a tumor.

Total removal was impossible, so the cyst was drained with strands of silk.

The patient made a quick recovery, and the drain was removed on the third day. The patient went home sixteen days after the operation with everything solidly healed.

For one month and a half he remained free from symptoms, then the aura returned. By the use of bromide he so far recovered that three months after recovery from the operation he went West and began to work. Later he began to work harder, with the result of bringing on more severe attacks. They continued to grow worse, and he finally returned for further operation, which was performed fifteen months after the previous operation. The size of the cyst cavity was found to be much larger, but the wall had the same character. The attempt was made to remove the wall, but it was impossible; wick drainage was introduced of gauze until a suitable drainage-tube could be made. The tubes were made the shape of a shirt stud, the stem being 20 French in size, perforated sufficiently to give good drainage. One just small enough to have the smaller end enter the cavity was introduced, and the drainage was much more free than with the gauze. The patient was up on the seventeenth day, and went home on the twentieth, but the button was not removed till the forty-fourth day, when the cavity was obliterated. The patient has since—two years—been free from any further seizures, and has apparently been completely relieved from further trouble. The contents of the cyst fluid made it probable that it was of traumatic origin, although there was no pathological examination of its wall.

Lorenz's Non-cutting Method of Treating Congenital Dislocations of the Hip.—ELLIOT (*Medical Record*, May 29, 1897) describes this new method, with which he says he has had unqualified success, as follows:

The first step in the operation consists in the reduction or bringing the head of the dislocated thigh to the level of the acetabulum. The patient is anesthetized to a degree of extreme muscular relaxation. If manual extension is insufficient, which is frequently the case, a band is passed around the perineum, protected by padding, and a soft band is put about the ankle. This latter band is attached to a screw-extension apparatus. The extension is now very carefully and evenly exerted. The operator grasps the muscles of the thigh with one hand, while the other is kept on the dislocated joint. As the extension gradually goes on the operator manipulates the thigh muscles, increasing their tension by intermittent pressure against the femur beneath, while with the hand upon the joint he appreciates the descent of the trochanter. The extension is stopped when the upper margin of the trochanter is at or just below Nélaton's line. While the extension goes on the pelvis on the diseased side is drawn down, causing some abduction of the thigh. This abduction is desirable to exert increased extension of the adductor muscles abnormally contracted. Fracture is to be avoided through care in having the extension uniformly exerted.

The next step is the reposition after the head has been reduced to the acetabulum.

Here is the chief difficulty of the operation, due in the main to changed anatomical findings.

The anterior fibrous wall of the capsule hugs closely to the surface of the acetabulum, and is rendered more taut by the extension. The acetabular

space must be opened as much as possible. This is largely accomplished by flexing the leg on the thigh, and the latter at right angles, which relaxes the anterior capsular wall.

The head of the femur must now be given an approximately frontal direction, thus turning it toward the hiatus of the now relaxed capsular pocket. Although the head is in the proper position to enter the acetabulum, no amount of manual force will drive it in.

The operator, standing on a stool, seizes the thigh, flexed at right angles to the trunk, with one hand, and, with the other grasping the head of the femur, he, by a system of extension combined with rotation and gradually increasing abduction, opens the way into the dormant-lying acetabulum pocket. When the abduction, which must be gradually exerted, has reached a considerable degree, the head of the femur, still manipulated by one hand, is felt to leap over the posterior edge of the acetabulum, and the surgeon feels at once that reposition has taken place. A distinct noise is clearly heard.

The dislocation may recur. To prevent it the angle of abduction must be maintained at not far from 90°. The leg is held in this position by a fixed plaster dressing.

The pain of the operation subsides in a day or two, and the patient is urged to walk. It is advisable to add a few inches to the shoe of the foot of the diseased side and give some support at first, but this walking about constitutes one of the most important parts of the treatment. Growth is reawakened, the parts are reactivated, and a nearthrosis is gradually built up.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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Trophic Keratitis in Caisson Disease.—GEO. C. HARLAN (Philadelphia) reports the case of a man, aged twenty-nine years, who had worked in a caisson under atmospheric pressure increasing from eighteen to thirty pounds in the course of three months. Fellow-workmen had been taken out unconscious, one had died, and one was said to be paralyzed. He had suffered for a month from occasional numbness of the right side, and when obliged to quit work the right eye had commenced to be irritable and painful. Six weeks later it presented a superficial ulcer with infiltration and ill-defined margins. The whole cornea was steamy, but not vascular. Slender posterior synechiae showed a moderate iritis. There was almost complete anæsthesia

of the cornea and conjunctiva and other parts supplied by the first and second branches of the fifth nerve. There was no motor paralysis. The corneal ulcer increased and hypopyon appeared; but perforation of the cornea did not occur, and the eye gradually improved, although still remaining insensitive.

As bearing on the nature of this disease, Harlan points out that the cornea will sometimes slough if exposed, although perfectly sensitive, but it will by no means always do so when insensitive. And he instances a case in which the insensitive cornea remained clear and bright until a progressive lesion produced ptosis, and the cornea was protected from the atmosphere when it rapidly sloughed.—*Trans. Amer. Ophthal. Society*, 1897, p. 103.

Syphilitic Dacryoadenitis.—H. E. JULER (London) says that symmetrical enlargement of the lachrymal glands is, perhaps, one of the rarer affections of the appendages we are liable to meet with, and he has little hesitation in attributing many instances of this condition to syphilis. These tumors start in the upper and outer part of the orbit, first in one, then in the other. Small nodules are felt at first, which multiply until symmetrical lobulated tumors exist, arching inward over the eyeball. Ptosis is the first obvious sign, though puffiness and even slight redness of the eyelids may be noticed. The periosteum may be very extensively involved, so that the nerves and even the muscles at their origin may be interfered with, giving rise to limited movement of the eyeball and anæsthesia of the forehead and scalp. There is no papillitis, the eyeballs do not pulsate, nor are they invaded by the growth. The close of the disease leaves the eyes as perfect as before.

He reports two cases, in one of which the growths continued to increase for six months, and then under increasing doses of potassium iodide and mercury slowly diminished, until a year later the orbits were again normal. In the other case the contents of the orbit were removed for a rapidly growing tumor situated in the region of the lachrymal gland, and supposed, until examined microscopically, to be sarcomatous.—*The Lancet*, December 11, 1897.

Retinal and Optic Nerve Lesions Associated with Gout.—C. S. BULL (New York) finds these to be: Changes in the walls of the bloodvessels of the retina, choroid, and optic nerve, including arteries, capillaries, and veins. Retinitis of a peculiarly localized character, confined to the posterior zone of the fundus, with or without hemorrhages in the retina and vitreous, and characterized by a peculiar yellowish exudation, occurring in clearly defined patches. Optic neuritis, generally with, but sometimes without, an accompanying retinitis. The changes in the fundus are always bilateral, though rarely symmetrical in the two eyes. The lesion may begin simultaneously in the two eyes, but this is by no means always the case. The degenerative changes in the walls of the bloodvessels, both arteries and veins, are at first very minute and often overlooked. They must be carefully searched for, as they begin in the intima.

The general angio-sclerosis and the patchy exudation in the retina cause marked impairment of central vision, but little impairment of the peripheral

vision, and the disease never ends in blindness. The loss of central vision is always progressive up to a certain point. Improvement of the vision, after the retinal disease is established, cannot be expected, though in favorable cases the existing vision may be maintained.

Hemorrhages into the retina are rare except in the comparatively early stages of the disease. When the vessels lose their elasticity by reason of the increase in the thickness of their walls, due to the deposits, they become stronger and more rigid, and hemorrhages are no longer to be feared.

The most marked feature in the ophthalmoscopic picture is the development of the angio-sclerosis in the vessels of the retina. This condition is confirmed by the microscope, and is seen to extend to the vessels of the optic nerve and choroid.

Another almost equally marked symptom is the peculiar yellowish granular exudation in the retina, located by the ophthalmoscope around the posterior pole of the eye, and generally leaving the macula intact until late in the course of the disease. This exudation is shown by the microscope to be mainly in the nerve-fibre layer, though found in all the layers except that of the rods and cones.

The changes in the optic nerves seem generally to be intraocular, but have been traced occasionally for some distance back of the eyeball.—*Transactions of the Fourth Congress of American Physicians and Surgeons, 1897, p. 4.*

Positive Aberration Due to Flattening of the Cornea.—DR. AXENFELD (Marburg) reports the case of a girl, aged fourteen years, whose eyes had been inflamed in childhood, who presented in one eye hyperopia of 5 D. in an area at the centre of the pupil about 5 mm. in diameter; while at the periphery of the pupil, moderately dilated, without a mydriatic, she had myopia of 8 D.; and the cause of this great difference in refraction was for the most part in the cornea.

This anomaly of refraction was confined to the right eye. Between the hyperopic centre and the myopic margin was a zone approximately emmetropic. Her vision was 6/XVIII without any lens, the same with -7 D., and slightly better with $+5$ D. The reflection from the cornea of parallel black and white bands, instead of being narrowest at the centre of the cornea, as is usual in normal eyes, was much broadened in this region.—*Archives of Ophthalmology, October, 1897.*

[Axenfeld, in place of the term "Positive aberration," employs the clumsy phrases "Corneal curvature the opposite of kerato-conus; corrigible peripheral myopia, and corrigible central hyperopia in the same eye." He urges that such cases should be removed from the group of irregular astigmatism and studied separately.

The editor, in a paper on the "Measurement of Refraction by the Shadow-test, or Retinoscopy," published in this JOURNAL April, 1885, called attention to "a bright circle at the margin of the pupil, with a fainter central area, which indicates curvature of the crystalline lens, greater toward the margin than near the centre of the pupil."

And in 1887, in a paper on "Symmetrical Aberration of the Eye," read before the American Ophthalmological Society, and published in its *Transactions*, he discussed at length this anomaly of refraction. This latter paper

began thus: "From among the various defects of the dioptric media grouped by Donders under the one name, 'normal irregular astigmatism,' it seems of practical importance to isolate and, habitually study alone the defect, or factor of defect, to which attention is here directed." The particular defect present in Axenfeld's case, resembling spherical aberration, was designated as Positive Aberration.

Aberration of this kind is present in the great majority of eyes, but is rarely of such high degree, and almost always depends upon the increased curvature of the periphery of the crystalline lens, rather than a flattening of the centre of the cornea. As the shadow-test comes to be more generally practised more of these cases are noticed. The careful study of them is likely to throw important light on the process of change in the refraction of the eye and the factors that produce it.]

Etiology of Dacryocystitis.—J. W. H. EYRE (London), from a study of the subject made in the bacteriological laboratory of Guy's Hospital, arrives at views of the etiology and pathology of this condition quite opposed to those commonly held, which regard the dacryocystitis as secondary to obstruction of the lachrymal passages. He admits that stricture of the nasal duct, when present, forms a very obvious predisposing cause of dacryocystitis; but is adverse to admitting its presence in all or even many of these cases. He regards stricture of the duct as a result of a long-continued supuration of the sac rather than a cause.

The steps by which it is brought about, he believes, are: 1. Invasion of the conjunctival sac by the streptococcus pyogenes longus, resulting in an attack of acute conjunctivitis. 2. Flushing of the conjunctival sac by lachrymal secretion and the washing of the streptococcus through the canaliculi into the lachrymal sac by the stream of tears. 3. Excessive secretion of mucus and exudation of leucocytes into the interior of the sac in the endeavor to remove the intruders. 4. Invasion of the mucous membrane lining the interior of the sac by the streptococcus, the appearance of the organism in the submucosa and finally in the cellular tissue surrounding the sac, and the consequent formation of pus in those situations to which it has gained access.—*Ophthalmic Record*, November, 1897.

Rapid Changes in Refraction in Glycosuria.—S. D. RISLEY (Philadelphia) reports two cases in which very important changes in the refraction were associated with variation in the amount of sugar secreted in the urine.

In one case of rapid improvement in the general condition, the sugar, which had been very abundant, entirely disappeared. The patient, aged forty-nine years, then found she could no longer read or see distant objects clearly with her glasses, + 2.75 D., although she had done so until within a few days. Under a mydriatic she was found to have full vision with + 5 \bigcirc + 1.25 cyl. and + 6 \bigcirc + 0.75 cyl. Ten days later, the glycosuria having returned, she was found to require lenses of 3 and 3.50 D. sph., with the above cylinders; and fifteen days after this she obtained full vision only with sphericals reduced to 1.25 and 1.50 D. There was no opacity of the lens.

The other patient, aged seventy-four years, had been carefully fitted with glasses. But six months later, his condition being improved in all other

respects, he was surprised to find that he could not see as well. On measurement he was found to require a convex lens 1 D. stronger for the right eye, and 0.75 D. stronger for the left. Within a month, however, the amount of urine and sugar having again increased, he was found to again require the former glasses.

Risley considers it probable that in these cases the change in the density of the tissue-fluids, suggested by the varying amount of sugar secreted with the urine, was sufficient to disturb the physiological relation of osmosis in the lens, and by this means cause the observed changes in the refraction of the eye.—*Trans. of the Amer. Ophthal. Soc.*, 1897, p. 121.

[Cases of diabetes giving the history of rapid changes in refraction have been encountered; but we do not know that any carefully observed case of such great and rapid change has been previously reported.—ED.]

Reid's Portable Ophthalmometer.—J. HINSHELWOOD (Glasgow) calls attention to the practical advantages of this instrument, which, although it was the subject, on the part of its inventor, Thomas Reid, of a communication to the Royal Society, five years ago, has not been so widely used as it deserves. In general arrangement it resembles other ophthalmometers. The doubling of the image is accomplished by a double prism, as in Javal's instrument. The object is an illuminated area of ground glass the size of which is controlled by an iris diaphragm. The curvature of the cornea is measured by the size of object necessary to bring the two reflected images of it in contact. When the cornea is spherical these images are circular. When it is astigmatic they are ellipses. The direction of the longer and shorter axes of the ellipses indicate the meridians of astigmatism.

The instrument is four inches long and weighs six ounces, occupying not much more space than an ordinary pocket ophthalmoscope. It can be used anywhere, with a patient standing, sitting, or lying down. A very moderate amount of light furnishes a satisfactory illumination. Both regular and irregular astigmatism are duly recognizable with it, and in the measurement of the former a high degree of precision (0.5 to 0.25 D.) can be readily attained.

The difficulties about using it are to hold the instrument steady and to focus it. The first is overcome by placing the little finger of the hand holding it against the patient's brow, and the second by gradually bringing the instrument toward the eye until the images are seen clearly.—*Ophthalmic Review*, November, 1897.

[The editor's trial of this instrument has satisfied him that it is an ophthalmometer of practical value and accuracy. Where a large instrument can be mounted to the best advantage with a proper illumination, the Javal ophthalmometer is probably a little better; but under other conditions Reid's portable instrument is more convenient and satisfactory.]

Ocular Crises in Tabes.—PEL (Amsterdam) reports recurring attacks of severe pain in both eyes accompanied by intense lachrymation, photophobia, and spasm of the orbicularis, lasting two or three hours, in a subject affected with tabes dorsalis. He denominates them ocular crises analogous to the gastric, intestinal, renal, and other crises known to occur in this disease.

But he claims that this is the first instance in which a tabetic crisis has been observed to involve a higher cerebral nerve—*i. e.*, the fifth. The crises thus far described have occurred only in organs rich in vagi and sympathetic fibres. If the varied endowments of the fifth nerve be considered, with its secretory, sensory, motor, and vasomotor fibres, it does not seem strange that this cerebral nerve should be affected with tabetic crises.—*Berliner klinische Wochenschrift*, 1898, No. 2.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF
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Foreign Bodies in the Nasal Passages.—DR. EDWARD F. PARKER exhibited to the South Carolina Medical Association (*Journal American Medical Association*, October 9, 1897) an accessory tooth which he extracted from the left nasal passage of an adult, twenty-nine years of age, who had consulted him for a chronic discharge from the nose. The tooth, evidently a canine, had been firmly embedded about midway between the anterior and posterior openings in the mucous membrane covering the bony floor formed by the hard palate. Its removal was followed by rapid amelioration of the symptoms complained of.

He also reported an instance of rhinolith removed from the left nasal passage of a lady, forty-five years of age, who for twenty years had suffered from a fetid discharge from the left side of the nose and chronic stricture of the lachrymal duct. A large, rough, irregular stone was found firmly lodged in an old suppurating ulcer just at the lower end of the tear-duct. As far as could be determined its exciting cause had been a piece of necrosed bone from a diseased tooth extracted years before. The annoying discharge ceased shortly after the removal of the foreign body.

Rare Fractures of the Nose.—DR. J. GARELL (*Annales des Maladies de L'Oreille, du Larynx, du Nez et du Pharynx*, October, 1897) reports a case of fracture of the inferior turbinated bone in a child, two years of age, due to a blow from a ball. There was no bleeding, and little attention was paid to it; but purulent and fetid secretion commenced in two weeks after the accident, and continued for two years, when the mother found a foreign body presenting at the orifice of the right side of the nose, which, when removed the next day, turned out to be the necrosed inferior turbinated bone.

Dr. Garel also summarizes a case reported by FREYTAG (*Monats. f. Ohren.*, March, 1896) which he states is the only other case on record. In the latter there was a fracture of the ascending superior maxilla; in addition the symptoms were far more acute, and there was deformity.

Adeno-carcinoma of the Nose, and Papillary Œdematous Nasal Polypi and their Relation to Adenomata.—At the last meeting of the American Laryngological Association DR. F. E. HOPKINS and DR. G. A. LELAND, of Boston, each reported (*New York Medical Journal*, 1897, No. 989) a case of adeno-carcinoma of the nose, the first in a male eighty-three years of age, the second in a frail woman of fifty years.

DR. JONATHAN WRIGHT, of Brooklyn, read a paper upon "Papillary Œdematous Nasal Polypi and their Relation to Adenomata."

These three papers should be studied together, especially that by Dr. Wright, which is illustrated with a number of pictures from sections under the microscope.

It appears from this study that the malignant growths are sometimes a distinct evolution of benignant growths, and that some cases are apparently hurried into malignancy by violent manipulations. The long conceived idea that the ordinary mucous polyp is a true myxoma must be abandoned, as it is positively shown that it is an œdematous growth, true myxoma being so rare that in the opinion of Dr. Wright it is never found in the nose. The œdematous polyp is usually the result of chronic inflammation. In some cases changes take place through epithelial proliferation and otherwise, which give these growths the papillary character. This has sometimes caused them to be mistaken for epitheliomas. An effusion of serum into the tissues and proliferation of the fibrous tissue produce an œdematous mucous polyp, while subsequent proliferation of the epithelium upon the surface and in the glandular growths transforms them into œdematous and papillary growths. These growths, in their turn, have a tendency to transformation into sarcoma or carcinoma.

Radical treatment rarely saves life, and sometimes fails even as a palliative.

Serum-therapy in Ozæna.—Some subjects of this disease, treated for diphtheria with anti-diphtheritic serum, have experienced great benefit to their old disease. Attempts have been made from time to time to introduce these injections as the special treatment for fetid chronic internal rhinitis.

In the Nov. number of the *Annales des Maladies de L'Oreille, du Larynx, etc.*, 1897, DR. E. LOMBARD presents an original memoir on this subject the result of some experiments made in the clinic of Dr. Gouguenheim. No other treatment was employed at the same time. The injections were made in the abdominal walls. General constitutional results were produced, such as erythema, pains in the joints, local arthritis, etc., as is not unusual in the employment of the serum for other purposes. Immediate results upon the ozæna are said to have been remarkable in general. The fetor becomes diminished, and even disappears completely. This effect appears to be a constant one. The crusts continue to be formed, and though they may become less abundant, they do not diminish rapidly. These beneficial results were maintained for a number of months after the treatment had been discontinued. Whether they will be permanent or not remains to be seen.

[On the whole, considering the constitutional injuries to which the patient is liable, we do not think that this method of treatment is to be commended, inasmuch as equally good results are obtainable by much milder methods, and without risk of constitutional contamination.]

Gumma of the Septum.—DR. E. LARUE VANSANT read a paper at a late meeting of the Section on Otology and Laryngology of the College of Physicians of Philadelphia on "Gumma of the Septum, with a Report of One Case."

Staphylorrhaphy.—Special successful results have been demonstrated by M. LINGER to the Belgian Society of Surgery (*Revue Internationale de Rhinologie, Otologie et Laryngologie*, August, 1897) by performing the palato-plastic operation in two sittings after Baizcau's method, and final staphylorrhaphy for congenital fissure of the hard and soft palate.

At the first sitting the operation is performed only upon the anterior three-fourths of the palate, avoiding the posterior palatine artery, its principal nourishing vessel. The second operation is not undertaken until the patients have recovered their strength, and the flaps have become self-nourished and capable of intimate union.

The second sitting causes more bleeding, on account of the section or rupture of the posterior palatine artery, but this hemorrhage is easily arrested by compression with sponges firmly secured to a holder.

In performing this palato-plastic operation in two sittings no lesions of the palatine flaps have been observed. The results have been excellent. The staphylorrhaphy is performed in one sitting, two movable bridges being secured by lateral detachments. For details the original article must be consulted.

Urticaria of the Pharynx.—At a late meeting of the Section on Otology and Laryngology of the College of Physicians of Philadelphia DR. JOHN MADISON TAYLOR reported a case of urticaria of the pharynx producing grave œdema of the glottis.

OTOLOGY.

UNDER THE CHARGE OF

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Cylindroma of the Concha.—HAUG reports the occurrence of cylindroma in the concha of a woman, aged sixty-five years. The tumor, in the course of twelve years, grew from the size of a cherry to that of a pigeon's-egg. Extirpation of the tumor was accomplished by means of scissors and knife. Entire recovery ensued in seventeen days. Haug claims that this is the first instance in which a cylindroma has been reported, with histological proof, as originating in the ear.—*Archiv für Ohrenheilkunde*, vol. xliii.

Ultimate Results of Operations on the Mastoid.—The above-named subject was discussed at the last meeting of the British Medical Association, held in Montreal.

DR. BULLER, of Montreal, in opening the discussion, considered the path-

ological conditions necessitating operation on the mastoid under two headings:

1. "Those conditions in which the bone is inflamed and softened, with or without purulent infiltration, or mere circumscribed collections of pus, but in which there is no actual caries of the bony structure.

"In this class, if decomposition of the inflammatory exudation or of the tissues involved has not taken place, there is no fœtid or ichorous pus. As a distinct type of mastoid disease, these cases are met during or shortly after acute purulent disease of the middle-ear, and more often in adults than in children."

2. In the second class are those cases "in which actual death of the bone has occurred more or less extensively, either in the form of caries or necrosis, or both. This class is found in the more chronic forms of middle-ear suppuration, and more often in children than in adults, though by no means rarely in the latter." In these cases the carious bone may not be confined to the mastoid, but often involves other parts of the temporal bone adjacent to the mastoid or tympanum. Dr. Buller's experience is that operations in the first class have been invariably favorable, "when the bone was opened before the occurrence of intracranial complications." All such recover in a few weeks after operation, "even to the extent of regaining perfect or almost perfect hearing," and recovery is permanent.

"The results may be very different when there has been extensive caries of the bone, or, perhaps, only a limited caries in an inaccessible position." In such cases the operator cannot follow definite rules; "he must follow, trace out, and remove diseased bone and inflammatory débris as he goes along, only staying his hand when he has removed all diseased bone, etc., that can be reached, or when, in his judgment, prudence dictates that he should go no further." Puncture of the lateral sinus is not to be dreaded especially; "the facial nerve is the structure which gives the operator the greatest anxiety." Of course, the more diseased tissue that is found and removed, the longer time will it take for the wound to heal and the ear to cease discharging, while restoration of hearing in chronic cases will not be great. Although most of the chronic cases recover—*i. e.*, do not die—"a certain proportion succumb to intracranial complications." The cases slowest to heal are those in which the diathesis is obviously strumous; but even here the prognosis is not without hope, if the treatment—both general and local—be careful and prolonged. The gravity and importance of mastoid disease cannot be too fully appreciated. "We never know exactly what we are going to meet with until we have begun the operation, and we never meet with two cases that are exactly alike in every detail. For individuality, mastoid disease bears the palm against all surgical conditions; hence the increasing respect it commands from all experienced otologists." Dr. Buller also reported a case of mastoid disease with sinus-thrombosis, evacuation of the sinus and ligature of the internal jugular vein, followed by recovery.

DR. ALBERT H. BUCK, of New York, followed Dr. Buller in the discussion, and, like him, limited his remarks "to those cases in which the disease is more or less strictly confined to the mastoid region and middle-ear." Such cases may be divided into acute and chronic. "In cases belonging to the former group the operation is almost always successful; and if, in course of

time, it be found that operative interference has not arrested or entirely cured the disease, the inference is warranted that our methods of procedure have been in some respects defective. In the chronic cases an equally favorable result may be expected from a thorough removal of all bone tissue that is diseased. There, however, the interference required is apt to be much more extensive than in the acute cases. It is not always an easy matter to decide, from inspection and from the degree of firmness which the bone manifests, whether we may safely allow it to remain. A high degree of vascularity, as shown by the color and by the persistent and copious character of the bleeding from the cut surface, and especially any evidences of an established stasis in some of the vessels, should be accepted as indications that the bone so involved is not likely to return to a condition of health, and consequently should be removed. The mere presence of granulation tissue in the pneumatic cells (without any recognizable amount of pus) is also a good indication that the bony framework in their vicinity should be entirely cut away. The grosser indications of disease will scarcely escape detection, provided the field of operation is made large enough to bring all the suspected parts into view."

MR. HUGH E. JONES, of Liverpool, Eng., in continuing the discussion, confined his remarks to the risks and complications of the operation on the mastoid. His experience is based upon about thirty cases, in which the radical operation on the mastoid and ear was performed chiefly for relief of chronic suppuration of the middle-ear. No fatal result has followed the operative interference, but facial paralysis has followed in four cases, twice transient and twice permanent. In order to avoid injuring the facial canal, the operator must see well into the cavity he is making in the bone. The difficulties in the way of this are bleeding and the unmanageableness of the partly detached auricle. Mr. Jones overcomes both of these difficulties by passing a strip of linen, ten inches long and two or three inches wide, at one end and tapering at the other, narrow end first, through the severed inner end of the auditory canal, out through the meatus, and then drawing the auricle-flap forward. This manœuvre not only holds the auricle out of the way, but the pressure of the strip arrests bleeding. "Giddiness and vomiting never lasted more than twenty-four hours. . . . Tinnitus has not been complained of as a result of the operation. . . . There has been no increase of the deafness; but, in the majority of the cases, the hearing was definitely, and in some cases greatly improved."

In five cases Mr. Jones operated chiefly to relieve pain; "they have all been very much freer, and some entirely free from pain, since the operation." While the operation has not always entirely and permanently checked the purulent discharge from the ear, in those cases in which some discharge has continued the conditions have improved, the patients are more comfortable, and the parts operated upon are more readily reached by treatment. Comparing the cases operated upon with concurrent cases of a similar nature in which operation has been declined, "the comparison has nearly always resulted in favor of the cases which have been operated upon."

DR. C. J. BLAKE, of Boston, limited his remarks to the selection of an operation and the bacteriology of the cases. Thirty-six cases in three months form the basis of his communication. His cases are classified as,

"First, cases of acute inflammation of the mastoid, originating in acute inflammation of the middle-ear, confined to the contents of the mastoid process, and in which thorough evacuation of the mastoid contents and establishment of free communication with the middle-ear through the mastoid antrum, followed by *filling the operative cavity with blood*, and closure of the external wound, resulted in what was practically a healing by first intention."

"Second, cases of mastoid disease in which the mastoid cortex had become more or less involved in the destructive process, and the operative procedure consisted not only in the evacuation of the mastoid contents, but also in the removal of portions of the surrounding wall without attempt at primary healing."

"Third, cases in which, in addition to the disease already mentioned, there was implication of structures surrounding the mastoid process, and invasion either of the cranial cavity or extrusion of the suppurative mastoid contents posteriorly toward the occiput or downward into the muscles of the neck."

"Dr. Blake finds that, as a rule, "the narrow, small, and pointed mastoid has a deep groove for the sinus, and a consequently small operative triangle; while, on the contrary, the broad, blunt, and rounded mastoid process is deeper posteriorly, and has an operative triangle of correspondingly greater size."

The attempt at primary healing, described above, was made in seventeen cases, eleven acute and six chronic. It failed in all the chronic cases, but was successful in five of the eleven acute cases. "No possible harm can result from it, since, if the blood-clot breaks down, the sutures can be easily removed and the wound allowed to heal by granulation." In eighteen cases, ten acute and eight chronic, in which it was not necessary to remove any part of the mastoid cortex, no attempt at primary healing was made. Of the acute cases all did well except one, which required a secondary operation; the other acute cases (eight) recovered promptly in from six to eight weeks after operation, while one (a diabetic) was still under treatment three months after operation. In nine cases (six acute and three chronic), in addition to thorough evacuation of the mastoid, portions of the diseased cortex were removed and the affected dura exposed.

Of the acute cases one died of septic cerebro-spinal meningitis ten days after the operation, one of intercurrent measles, one was discharged well in two weeks, one at the end of five weeks, and two were convalescent in the out-patient department at the time of Blake's remarks. Three chronic cases were under treatment in the out-patient department slowly improving. In all these nine cases pus was found in contact with the dura; in five the sinus-wall was exposed in the operation, and in two accidentally opened, with resultant hemorrhage. In three acute cases pus was found between the dura and the posterior superior angle of the mastoid. In two of these cases the sinus was exposed for an inch by the operation, and in the third "the inner wall and the tip were removed from both mastoids and the pus followed back into the jugular fossa and the contiguous bony wall thoroughly everted, with good results." In one case, acute, a small brain-abscess was found over the antrum. After operation rapid recovery ensued. In a chronic case, a child aged five years, a cerebellar abscess was found

and evacuated, and, notwithstanding marked cerebral hernia, appeared to be making a speedy recovery. In the cases of infectious cerebro-spinal meningitis, referred to above, the diagnosis was confirmed by lumbar punctures, performed by Dr. J. J. Putnam.

In review of Blake's cases it may be said that "all of the cases of acute mastoid disease did well in the sense of rapid recovery, with two exceptions, and that the same may be said of 50 per cent. of the chronic cases. The other 50 per cent. of the chronic cases were either very slow in healing, or required secondary operations."

The streptococcus was found pure in twelve cases; staphylococcus in five cases; diplococcus in six cases; streptococcus and diplococcus, five cases; streptococcus and bacillus foetidus, three cases; staphylococcus and bacillus pyocyaneus, one case; streptococcus and diplococcus (staphylococcus?), one case; streptococcus, staphylococcus, and diplococcus, two cases.

As a rule, the same germ, obtained by paracentesis, was found later in the mastoid. Blood-counts showed that whenever pus was in contact with the dura, leucocytosis was found, while with the mastoid inner cortex intact, even though the mastoid cavity was filled with pus, no leucocytosis was observed.

"In conclusion, it may be said that this series of cases emphasizes the conclusions drawn from previous experience that all diseased bone, cortical or otherwise, should be removed and the pus followed to its ultimate extension when possible, after thorough surgical cleansing by the operative procedure; healing by first intention should be favored, and that in case of hemorrhage from the lateral sinus or from meningeal arteries, by rapidly enlarging the opening in the bony wall of the cranial cavity, the normal brain pressure may be utilized to plug the vessels, and the operation continued without interruption."—*British Medical Journal*, No. 1926, 1897.

DERMATOLOGY.

UNDER THE CHARGE OF

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Treatment of Scleroderma.—A. PHILLIPSON (*Deutsche med. Wochenschrift*, 1897, No. 33) reports two cases of the diffuse form of this disease (one being a moderately severe and the other a severe manifestation) with salol. The first case was cured after eighteen months' treatment; the second was distinctly improved after five and a half months. The dose was from 30 to 45 grains daily, the writer observing that this drug may be taken for a year continuously without disturbing the stomach. Light gymnastics are recommended for the stiffness of muscles, tendons, and joints.

Trichorrhæxis Nodosa Barbæ.—SPIEGLER'S (*Archiv für Dermatologie und Syphilis*, Bd. xli., Heft 1) conclusions concerning this affection are as follows:

Trichorrhæxis nodosa barbæ is a parasitic affection produced by a bacillus most probably identical with that described by Hodara. This bacillus is found constantly in the diseased hairs as heaps of cocci, as well as rods up to 12 μ long; it is found not only in the hairs themselves, but in the sub-epidermal part of the hairs and in the cells of the wall of the follicle. It may be cultivated upon the usual media. Sound hairs do not show such colonies, nor can the bacillus be cultivated from such hairs. Other micro-organisms, so far as known, cannot produce *trichorrhæxis nodosa*. Since the aim of rational therapy is to eliminate the cause of disease, regular shaving, epilation, and the application of parasiticide ointments are necessary.

Eruptions of Sudoral Origin.—PERRIN (*Annales de Dermatologie et de Syphiligraphie*, 1897, No. 11) calls attention to the various eruptions occurring during the heat of summer, associated with abundant perspiration. When the heat of summer is excessive a great number of inflammations of the skin, having a furunculous aspect, are observed. These are coincident with sudamina, miliaria, sudoral exanthemata, and dysidrosis, with a degree of frequency more or less marked, according to the heat. It is in infants that these eruptions are most frequent, and women are more predisposed to them than men. They are localized in those regions where the skin is delicate and the secretion of sweat most active, the places of predilection being the face, the scalp, the neck, the upper part of the trunk, the dorso-lumbar region, and the flexor surface of the upper extremities. The eruption consists of more or less voluminous nodes, frequently in great numbers, with or without the production of pus, tubercles, and papulo-pustules. Left to themselves, not all these lesions suppurate; some of them may become indurated and finally disappear. Cure is rapid if treatment is instituted and the patient is placed in proper hygienic conditions. These eruptions seem, like sudamina and miliaria, to be consecutive to the sudoral flux. Under the influence of this and the congestion of the skin, staphylococci find a soil suitable for their growth and acquire great virulence, causing adenitis or periadenitis. They penetrate the sudoriparous glands and the pilo-sebaceous follicles.

Disseminated Gangrene of the Skin due to Iodide of Potassium.—AUDRY (*Annales de Dermatologie et de Syphiligraphie*, 1897, No. 11) reports the following case: A woman, aged forty-seven years, after an attack of seborrhœic eczema of the face, suffered from extreme nervousness, and upon the advice of a pharmacist, she took iodide of potassium internally, which produced a characteristic bullous eruption. Suppression of the drug was followed by a speedy cure. Two years later she again took a preparation containing iodide of potassium for a period of six months, at the end of which time she presented herself, with large ulcerations of the skin in the left axilla, beneath the left breast, in the bend of the left elbow, on the scalp, in the perineo-crural and in the lumbar regions, the most extensive

lesions being in the two last-named situations. The ulcers were sharp-cut, with slightly elevated borders. The mucous membranes were unaffected. The urine contained neither sugar nor albumin, but the patient's general health was bad.

Treatment of Lupus by Injections of Calomel.—DUBOIS-HAVENITH (*Annales de Dermatologie et de Syphiligraphie*, 1897, No. 12), at a séance of the Société Française de Dermatologie et de Syphiligraphie, reported fourteen cases of lupus treated by one of his former pupils, Dr. Asselbergs, by injections of calomel. The effect of these injections in almost all the cases was decided, being most marked when first employed, but growing weaker as the number was increased. A complete cure was obtained in several cases; in others a marked improvement was manifest. This treatment seems especially useful in old tuberculo-ulcerative cases with deep infiltration.

Pityriasis Rosea.—KROMAYER (*Dermatologische Zeitschrift*, Bd. iv., Heft 6) reports a case of pityriasis rosea produced by the irritation of new stockings. Fourteen days after a young woman had exchanged woollen stockings for new cotton ones a macular eruption resembling pityriasis rosea exactly appeared upon the legs up to the knees, covering those parts in contact with the stockings. The reporter concludes that the mechanical or chemical irritation of new underwear is one of the etiological factors concerned in the production of this disease.

Hydroa Æstivale, with Hæmatoporphyrin in the Urine.—MCCALL ANDERSON (*British Journal of Dermatology*, January, 1898) reports two cases of hydroa æstivale occurring in brothers, in which the cutaneous eruption was complicated with the appearance in the urine of a Burgundy-colored pigment free from proteids and iron, allied to uro-hæmatoporphyrin. There was an eruption on the face, ears, and hands, which usually began in early summer and disappeared on the approach of winter. The disease began with sensations of itching and burning in one of the localities mentioned. In ten or twelve hours this was followed by the formation of blisters from a pea to a crown-piece in size. The rupture of these lesions was followed by cicatrization and contraction, and as a result the fingers became so stiff that the patient was unable to completely close his hands. The urine was of a light Burgundy-red color during the attacks, becoming normal in the intervals in the first case, but never resuming its normal color in the second.

Eosinophilous Cells in the Blood in Syphilis and Skin Diseases.—PETER (*Dermatologische Zeitschrift*, Bd. iv., Heft 6), from his investigations, concludes that in no form and in no stage of syphilis, even in extensive fresh eruptions, is there an increase of eosinophilous cells in the blood, and that the statements concerning their occurrence in skin diseases should be essentially modified. There are only a few diseases of the skin in which this increase frequently appears, as certain eczemas and forms of pemphigus. A constant increase of eosinophilous cells is found only in prurigo, and here it is demonstrable with the first appearance of the eruption in childhood. In the concurrence of skin diseases and eosinophilia it is by no means to be

accepted that the skin affection is primary; on the contrary, it should rather be supposed that both are the results of the same cause. What circumstances lead to the constant increase of eosinophilous cells in prurigo is not yet clear.

Granuloma Trichophyticum Majocchi.—PINI (*Archiv für Dermatologie und Syphilis*, Bd. xlii., Heft 1) briefly reviews the literature of this unusual form of trichophytosis, and reports three new cases, from the study of which he draws the following conclusions: There exists a clinical complication of herpes tonsurans which differs from kerion and syecosis. It consists of round or flat nodules from a rose-red to a cyanotic hue, scattered about or, more frequently, arranged in chains, developing very slowly, inclined to softening, but never ending in suppuration. The histological structure of these nodules is different from those formed through inflammatory folliculitis, and is like that of the granulomata. The etiological factor is the trichophyton which occurs within the granuloma in the form of hyphæ and spores.

Salicin in the Treatment of Lupus Erythematosus.—CROCKER (*British Journal of Dermatology*, January, 1898), at a meeting of the Dermatological Society of London, showed two cases of lupus erythematosus in which salicin had been administered in fifteen-grain doses, three times a day, with excellent result, a cure occurring in one and great improvement in the other. The external treatment consisted in the application of ealamine lotion, which was painted on twice a day. In the case in which a cure had resulted, the treatment had been continued about five months; the second case had been under treatment for a shorter time. It was not claimed that salicin would cure every case, but that a good many were cured or improved by this form of treatment.

OBSTETRICS.

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The Elimination of Germs through the Milk-glands.—In the *Berliner klinische Wochenschrift*, 1897, No. 45, BACH and WELIMINSKY report experiments undertaken to show the results of the presence of infectious germs upon the milk-glands.

They selected guinea-pigs for their researches, and took every precaution to make the glands and nipples thoroughly aseptic. They then injected cultures of anthrax, which resulted fatally to the animals, but which did not produce infection of the milk.

The opposite, however, was the result when intravenous injections of pus-

forming bacteria were made. In from five to eight hours after injection these organisms were found in the milk.

In the case of two women, suffering from puerperal septic infection, streptococci were found in the blood, but not in the milk.

The writers conclude from their experiments that infective germs which gain access to the milk do so simply by circulating through the glands in the blood stream, and that to enter the milk they must pass through the glandular substance of the breast through some injury to the gland substance.

The question whether the milk of the infected animal is fit to use must be settled for each case by a careful study of the individual patient.

A Combined Intra- and Extra-uterine Pregnancy at Term.—In the *American Journal of Obstetrics*, December, 1897, ROYSTER reports the case of a colored woman, aged thirty-four years, who had had six children in easy labors. A negro midwife delivered the patient forty-eight hours before of a living child in the natural way, but sent for the doctor because a second child was retained which could not be expelled.

On examination the uterus was empty and unruptured, while a full-term foetus was lying transversely inside the abdominal cavity. A diagnosis of abdominal pregnancy at term was made, and operation advised. This was refused.

Some time afterward, when the child had died and the patient was threatened with sepsis, consent to operation was obtained. On investigating the history it was found that rupture of the sac had occurred. On abdominal section, a dirty yellowish fluid escaped from the abdomen, the foetus was delivered, and the cord tied and cut. The placenta was adherent to the abdominal wall and the left side of the pelvic brim. The gestation sac was entirely outside the peritoneum, and the general cavity of the abdomen had only been opened for two inches. The placenta was loosened by dissection and two silk ligatures placed upon vascular adhesions. There was little bleeding. The sac was washed out with hot salt solution, sponged dry, and the abdominal wound closed with silkworm-gut sutures, strips of gauze being used for drainage at the lower end of the incision. The cavity drained for several weeks, the patient finally making a good recovery. The ectopic foetus was fully developed, weighing four and one-quarter pounds. The placenta weighed two pounds.

Spurious Abortion, with an Account of Three Cases.—In the *British Medical Journal*, 1897, No. 1925, EDEN contributes a paper upon the above subject. His case was as follows:

The patient was a multipara who had missed her menstruation for eleven weeks. After one day's hemorrhage a fleshy mass was expelled, which was at first thought to be an abortion. While menstruation was absent there had been morning sickness, but not as severe as in previous pregnancies. The patient made a complete recovery.

On examining the mass which had been expelled, it was found to be a triangular cast of the uterus, measuring four inches by three and three-quarters inches, and varying in thickness from 3 to 8 mm. The outer surface was rough and uneven; the inner dull, glistening, and thrown into numerous longitu-

dinal folds. There was interstitial hemorrhage at the apex of the cast. Thorough microscopical examination could find nothing but decidua. There was no trace of placenta or chorion. This is what is termed "Spurious Abortion," and is defined as the development within the uterus, in the absence of gestation, of a membrane having the essential characters of the decidua of pregnancy and accompanied by signs of early pregnancy. Its separation and expulsion from the uterus with hemorrhage simulate abortion.

There are two explanations for such a condition. One is that an ovum was actually fertilized, but perished at a very early period, while the decidua continued to grow. The second theory is that some other stimulus may cause the formation of decidua and prevent menstruation. The first is the more probable explanation.

In addition to his own, Eden quotes Griffith's case, and also that reported by Dakin.

Griffith's patient had never been previously pregnant. She suffered from symptoms of early gestation. A cast of the uterus was expelled, composed of decidua. The womb was somewhat enlarged.

In Dakin's case the patient had borne a stillborn child eight months before the spurious abortion. At this time she was treated for subinvolution, and recovered. After a slight interruption of menstruation she expelled a uterine cast. There was a lump on the right side of the abdomen. The uterus was enlarged and the patient was thought to have an ectopic gestation. The abdomen was opened, when the lump was found to be an ovarian cyst, which was removed.

In this case pregnancy can be positively excluded, yet the patient had a brief, definite period of amenorrhœa and marked enlargement of the uterus with the discharge of a cast.

A Case of Strangulation of a Full-term Child, with Tympany of the Uterus and Emptying of an Echinococcus Sac through the Uterus.—In the *Monatsschrift für Geburtshilfe und Gynäkologie*, 1897, Band vi., Heft 5, BONORDEX reports the case of a patient who had lost a child in her first labor through neglect, and who had been treated for a vesico-vaginal fistula.

The patient had a tumor on the left side of the uterus, which in her second confinement obstructed labor and which had to be punctured. It yielded a clear serous fluid. This labor terminated spontaneously. When the patient came under observation she was four months pregnant, and the cystic tumor was very plainly outlined. She declined operation until after the pregnancy should terminate. She finally came into labor, and puncture of the tumor was made with very slight results. The membranes ruptured and the child's heart-sounds ceased. Fluid was again taken from the tumor and the child was gradually expelled, the cord being tightly drawn around the neck. As the body of the child emerged, very foul gas escaped from the uterus. The patient had a rapid pulse, bleeding from the womb, elevation of temperature, with a foul discharge. The tumor ruptured into the uterus and discharged through the womb and vagina. Microscopic examination of its fluid showed it to be an echinococcus cyst. The patient made a tedious recovery under stimulating treatment and vaginal douches. There remained in the pelvis adhesions at the site of the tumor.

Total Inversion of the Uterus after Abortion.—In the *Centralblatt für Gynäkologie*, 1898, No. 3, SWITALSKI reports the following case: The patient was a multipara who aborted at five months, with severe hemorrhage. The placenta was retained for several hours. On admission to the hospital the patient was found an ill-nourished, anæmic woman. The uterus was completely inverted, its mucous membrane excessively pale in color. Under chloroform anæsthesia an effort was made to reinvert the uterus by manipulation. This procedure was unsuccessful, the anterior wall of the uterus being torn and the bladder stripped up from the womb. Küstner's operation was then performed. The posterior cul-de-sac was opened and a longitudinal incision made in the posterior wall of the uterus. This loosened the contraction ring, when the womb was readily reinverted. The posterior wall was then sutured, and the peritoneum also. The patient made an excellent recovery.

A piece of the womb was excised for examination, and its muscular tissue found in a degenerated condition. It was impossible to tell how the inversion had happened, although the thinness of the muscular tissue and the degeneration of the muscle-fibre must have contributed to the result. In this case the success of Küstner's operation was very pronounced.

The Absolute Indication for Cæsarean Section.—In the *Centralblatt für Gynäkologie*, 1898, No. 3, GUERARD draws attention to the measurement between the tuberosities of the ischia and its value as giving an indication for Cæsarean section. He was called to a patient in labor who had a kyphotic, funnel-shaped pelvis in which the distance between the tuberosities of the ischia was 4.7 cm. The pelvis was so much contracted that Cæsarean section was clearly indicated. The child was living and in good condition. The parents, however, absolutely refused to allow the operation. Accordingly, under protest, craniotomy was done. It was impossible to extract the head without removing the individual bones. The clavicles were then cut and the body of the child finally removed. The mother made a good recovery.

After her convalescence the transverse diameter of her pelvic outlet was measured by introducing a pelvimeter within the birth-canal, and the original measurement was found nearly correct. The case is reported as an example of successful embryotomy in a highly contracted pelvis.

Cæsarean Section, with Transverse Incision and Total Removal of Uterus because of Sepsis.—In the *Centralblatt für Gynäkologie*, 1898, No. 4, SIEDENTOPF reports the case of a patient brought to the Magdeburg clinic in labor twenty-four hours, and infected. The patient had a flat rhachitic pelvis, so small that a living child could not be delivered. The child was in fairly good condition, however, while the mother was jaundiced, had albumin in the urine, and had constitutional infection. After waiting a reasonable time for the head to engage, and finding no progress, the patient was anæsthetized, the abdomen opened, and the uterus opened by a transverse incision across the fundus. The child was readily extracted, asphyxiated, and was resuscitated. The placenta was removed and the incision closed. The cervix was then brought together with forceps, and the upper portion of the abdominal incision sutured. The bladder was separated from the

uterus, the broad ligaments ligated and the uterus entirely removed. The operation was partially performed through the vagina. The patient made an excellent recovery.

As regards the extraction of the child, it was rapidly and successfully done without bleeding, and the incision readily closed. It was thought best, however, as the uterus was infected, to remove it.

Cæsarean Section After the Mother's Death.—DOHRN (*Centralblatt für Gynäkologie*, 1898, No. 4), in a paper upon this subject, urges that no operation should be performed before the twentieth week of fetal life. It is also a rule that not more than twenty minutes should elapse after the mother's death before the child is removed by Cæsarean operation.

The Treatment of Placenta Prævia.—In the *Glasgow Medical Journal*, January, 1898, JARDINE reports the case of a patient eight and a half months pregnant, who had a marginal placenta prævia. The membranes were ruptured and the uterus stimulated by friction. The patient delivered herself spontaneously, and made a good recovery.

Jardine has collected fifty-one cases in which various methods of treatment were employed. In one of these labor was induced for contracted pelvis, and De Ribes' bag was introduced as a dilator. The bag burst, and severe hemorrhage occurred. The child was immediately delivered, when it was found that the placenta had been attached low down. The patient died of shock.

In discussing treatment, Jardine urges that emptying of the uterus is the only reliable method. While the tampon is valuable in many cases, it occasionally converts an evident hemorrhage into a concealed bleeding.

Oophorectomy During Labor.—In the *Boston Medical and Surgical Journal*, 1897, No. 26, REYNOLDS reports the case of a patient in labor who had an ovarian tumor. The tumor was at the bottom of Douglas' fossa, and about the size of a seven-months head. The os was as large as a five-cent piece and could be reached with difficulty above the tumor. The patient was etherized, placed in the knee-chest position, and gentle taxis tried for ten minutes. This failed, and some hours later was again tried without result. The abdomen was opened, when large quantities of pus escaped. The tumor was firmly adherent to the bottom of Douglas' fossa and was necrotic. The tumor was tied off with catgut. The forceps was then applied through the vagina, but failed to deliver. As the fetal heart did not beat, the head was perforated and the child extracted. The intestines and abdomen were cleansed as well as possible, and salt solution poured into the abdomen, a capillary drain inserted, the wound hastily closed, and the patient put to bed with the foot of the bed raised. The patient made a gradual recovery, complicated by a transient infection of the uterus.

The forceps failed to extract because of a tight constriction-ring about the neck. As the abdomen was opened this could be seen. The head of the child was contained in the spherical lower part of the uterus, its body so bent by the contracting uterine muscles that its backbone lay almost transversely across the abdomen.

Reynolds believes that in such cases gentle taxis should first be tried, with the patient under ether. Should this be unsuccessful, it should be repeated after a few hours. Should failure occur the abdomen must be opened, the uterus incised, the foetus removed, and the tumor, if possible. Should unusually firm adhesions be present the removal of the tumor should be deferred. When the patient has been infected it would be better to remove the tumor and deliver the child through the vagina without opening the uterus.

Two Cases in which Porro's Operation was Performed for Pelvic Tumors Preventing Delivery.—ROBSON (*British Medical Journal*, No. 1921, 1897) reports the case of a suppurating ovarian cyst complicated with an abscess bounded by uterus, cyst, and intestines, in which he delivered the child by the Porro operation, followed by the gradual recovery of the mother. So soon as the child was delivered by uterine incision and the uterus was brought forward, a large abscess in the abdomen was opened, filled with offensive pus. The tumor and the womb were so adherent that both were amputated together, the abdomen washed out with hot borie solution, and a glass drainage-tube introduced to the bottom of the pelvic cavity. The patient's temperature immediately fell to normal and remained so. His other case was that of a myoma successfully operated upon in the same way.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

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Pollution and Self-purification of Rivers.—PROF. GUSTAV KEBREHL (*Archiv für Hygiene*, xxx. 32) has made, for more than a year, a daily bacteriological examination of the water of the Moldan, taken at three points: before and just after its entrance to the city of Prague, and where it leaves it. From the results obtained he finds that the number of bacteria occurring at any one point varies very widely, and, in general, that with rising water it increases, and with falling it diminishes. The variations are due to changes in the rate of flow, with consequent alteration of conditions for sedimentation and influence of light, and to the influx of temporary pollutions from various sources, such as washings from streets, dung-heaps, etc., which, under some circumstances, pollute more extensively than the regular normal unclean influents, such as sewage. Therefore, in judging of the pollution of a river, the abnormal factor—that is to say, the occasional foul influx after heavy rains—must be eliminated. This is the case when the falling stream, in a

period free from rain, approaches in respect to its depth the normal, when the existing pollution is the normal pollution. Bacteriological examinations at high water, or at low water, at the time of beginning rise, or at the time of local rains without rise, may lead to gross errors, and are, in consequence, worthless for the estimation of the normal pollution. At points where considerable pollution by organic matter is observed, the number of organisms is largely dependent on the temperature, which, however, has no marked influence where their number is small. With rising water, the differences in the pollution at single points, which stand out sharply in comparison with the normal pollution, may to a greater or less extent disappear, and thus the influence of polluted influents and of the self-purification of a river may be more or less hidden.

[From a practical sanitary standpoint, the nature of the occasional and constant polluting influents is of much greater importance than the amount, especially when, as is often the case, two or more polluting influents of widely different character may, by their mutual action on each other, bring about extensive chemical as well as bacteriological purification.]

Influence of Pollution, Temperature, and Ventilation on the Hardness of Ground Water.—DR. GUSTAV VON RIGLER (*Archiv für Hygiene*, xxx. 69), in determining the influence of these factors, used clean sand as a soil and urine mixtures of varying percentage-composition as a polluting agent, and obtained some striking results. The amounts of lime and magnesia in the urine mixtures were determined in each case before the latter were employed. The first series of tests made with distilled water demonstrated that less and less lime and magnesia are washed out of the soil as the exposure continues. Next, using water containing 1 per cent of urine, and, therefore, insignificant amounts of lime and magnesia, it was shown that the hardness of the effluent was increased gradually from ten to forty-eight degrees. Employing 10 per cent. of urine the hardness rose more rapidly from eleven to two hundred and sixty-nine degrees. Adding, from day to day, to the same specimen of sand, mixtures of urine containing first 1 per cent., then 2½, 5, 7, and 10 per cent., it was found that the hardness rose gradually, and then fell, the highest degree attained being with 5 per cent. Thus, excessive pollution reduces the power of the water to withdraw lime and magnesia.

Experiments on the influence of temperature proved that the hardness rises and falls respectively with increased and diminished heat.

Investigating the effect of aëration, he showed that from a soil extensively polluted but well aired, the effluent water rapidly gains, then gradually diminishes in hardness; but that when it is not well aired, the hardness increases slowly but constantly. With extensive pollution and no aëration, the hardness increases gradually for a time, and then gradually falls.

The degree of pollution, the temperature, and the amount of air present exert individually and collectively a great influence on the decomposition processes in the soil, particularly the formation of carbon dioxide, nitric acid, etc., and hence on the solution of the constituents to which hardness is due.

Cause of Death of Fishes in Polluted Rivers.—DR. W. THÖRNER (*Forschungsbericht für Lebensmittel*, 1897, 172) has thrown considerable light on the

cause of death of fishes in polluted streams by his investigation of a case where, in spite of the large extent of pollution present in a river, the water could not be regarded as abnormally foul, and yet large numbers of fish had died. The polluting matters were partly in solution and partly in suspension, and much in a condition for further oxidation. He noticed considerable amounts of ferric hydrate, and its presence suggested that the iron had entered the river in the ferrous form, and had then been oxidized at the expense of the dissolved oxygen of the water. The complete or very large withdrawal of this element by the process of oxidation would naturally render the water incapable of sustaining fish life. Analysis of two samples of the water showed in the one case 57.2 c.c. of total dissolved gases per litre, consisting of 60 per cent. of carbon dioxide and 40 of nitrogen, and in the other 67.2 c.c., consisting of 67.2 per cent. of carbon dioxide and 32.8 of nitrogen. Thus, in neither case was there any oxygen, and hence the death of the fish.

[This explains, in part at least, the disappearance of fish-life in many streams polluted by the sewage of manufacturing establishments, and why the same does not occur where sewage outlets enter the sea, where there is necessarily much aëration.]

Inoculations for Plague.—PROF. HAFKINE'S report to the Bombay Standing Committee on the results of inoculation for plague gives an account of his work on the inmates of the jail at Byculla. Between January 23d and 29th nine cases occurred, five of which were fatal. At the beginning of the outbreak the population of the jail was 345. On January 30th, prophylactic treatment was applied to 154 inmates who volunteered to be inoculated. One person had a painful gland in the left groin and two others developed painful glands in the left axilla the same evening; the three cases proved fatal. On the following day two cases occurred among the inoculated, and both died. One of the inoculated persons was taken, but recovered. On the second, third, fifth, and sixth days cases occurred among those who had not been inoculated; all fatal. No cases occurred among those who had been inoculated from the first day until the seventh. On the seventh day there were five cases among the non-inoculated, one of which was fatal, and one occurred among the inoculated, but ended in recovery. From January 31st to February 6th twelve cases occurred among the non-inoculated, six of which were fatal, and but two cases among the inoculated, both of which recovered.

Haffkine concludes that the injection of 3 cubic centimetres of prophylactic seems to be sufficient to effect the desired protection. It cannot arrest symptoms already started or that show themselves within a few hours, but the time necessary for it to produce the protective effect is very short.

Transmission of Typhoid Fever through the Air.—The fact that many authorities regard infected air as a common, and, indeed, by some as the principal, medium of transmission of typhoid fever, led DR. EDUARDO GERMANO (*Zeitschrift für Hygiene und Infektionskrankheiten*, xxiv. 403) to institute a series of experiments to determine whether or not this view can be supported by facts. The infected air theory is based on a large number of observations, the value of which must not be overrated, and Germano cites

a number of outbreaks which have been attributed to air-infection. In his experiments he used various kinds of dust and dirt, and from the results obtained he concludes that, contrary to the commonly accepted opinion, the typhoid germ is unable to withstand complete drying, and hence cannot be transmitted to man through dust that is dry enough to be disseminated by air-currents. Infection through the air, especially over a distance of several hundred metres, as is assumed in one of the cases cited (Froidboise), must be regarded as wholly inconceivable. Experiment showed that the typhoid germ can live not only in moist surroundings for a long time, but, under certain circumstances, even in an apparently dry condition. This is possible when it adheres to or is encompassed by matters which themselves contain a certain amount of moisture, such, for instance, as clothing, linen, particles of dirt, and fecal filth. Most of the bacilli die as the drying process progresses, but certain ones are more or less resistant, though not necessarily dangerous on admission to the air, since then complete drying and consequent death occur. They are dangerous only in case of introduction into the system by direct or indirect contact, as from the fingers, food, or eating utensils.

Nevertheless, this very property of retaining vitality for a long time in a half-dry condition must be regarded as an important factor in typhoid infection.

Tubercle Bacilli in Butter.—PROF. O. ROTH (*Correspondenzblatt für Schweizer Aerzte*, September 15, 1897) contributes a second paper on the examination of butter for tubercle bacilli. The results of his examinations, reported in 1894, were based wholly on experiments with animals, which procedure requires the expenditure of a great deal of time. This fact led him to attempt the demonstration of the bacilli by cover-glass preparation, and after a number of trials of different methods he found one which commended itself. He employed a butter which he made from milk rich in tubercle bacilli which was derived from a cow with a tuberculous udder. With thorough or even superficial washing with water the bacilli of the butter could be detected in the wash-water, but a surer method was needed, and the following was devised: Two to four grammes of butter are introduced into a test-tube about three-fourths full of water, and kept at about 50° C. in a water-bath until the fat is completely melted, then shaken thoroughly to separate the bacilli from the fat, and inverted and allowed to cool until the fat is again solidified. The water is then poured out and centrifugalized, or allowed to stand for sedimentation in a conical glass or separating funnel. To prevent the increase of other bacteria a little formalin may be added. After centrifugalizing, or after twelve to twenty-four hours' standing, cover-glass preparations of the sediment are made. These are dried by gentle heat, treated with alcohol and ether for the removal of all traces of fat, and then stained. With his tuberculous butter, the bacilli were found in this manner in great numbers. Unfortunately, he could get no more milk in which the bacilli could be directly demonstrated by the microscope, and so could not further investigate the question whether they can be demonstrated in butter made from mixed milk containing only a small proportion of infected milk. Artificially infected milk is not suitable for the study of the question on account of the difficulty of securing uniform distribution of the bacilli.

Coming soon after the publication of Roth's article, is one by DR. LYDIA RUBINOWITSCH (*Zeitschrift für Hygiene und Infektionskrankheiten*, xxvi. 90), bearing directly on the question which Roth could not investigate. She reviews the conflicting evidence in the literature of the subject, and gives the results of her own work on eighty samples of shop-butter, thirty obtained in Berlin and fifty in Philadelphia. The tests were made with animals, using two for each sample. From the whole number of specimens examined not once did she detect any tubercle bacilli which, by culture or pathological behavior in animals, could be pronounced genuine. On the other hand, over a fourth of the samples (28.7 per cent.) produced in guinea-pigs changes which macroscopically and microscopically could deceive one into the belief that they were genuinely tuberculous, but which with more careful examination proved otherwise. Among the Berlin samples ten yielded what seemed to be tubercle bacilli; with one, both animals yielded this bacillus and showed the apparently characteristic changes; with two, one animal did the same and the other died of peritonitis; with three, one animal did the same, and the other yielded only the changes; and with four, one animal did the same, and the others showed no change. The remaining twenty Berlin samples gave the following results: With three, rapid death of both animals from peritonitis; with two, one animal normal, the other showed the resembling pathological changes, but no bacilli; with seven, one died and the other was normal; and with the other eight, both animals remained normal. The fifty Philadelphia samples yielded essentially similar results. In every case where the bacillus like that of tuberculosis was found, careful investigation showed that while it presented many close points of resemblance it was certainly not the same.

The majority of the animals which did not die of peritonitis were killed after from three weeks to over three months from the time of inoculation. A few which showed a considerable loss in weight at the end of the second week were killed and examined at that time.

[The very careful and painstaking work of Dr. Rubinowitsch throws a very decided doubt on the accuracy of the results of those writers who have during the past few years reported the presence of tubercle bacilli in all grades of market butter, and suggests that they had to deal with the same or another bacillus closely resembling that of tuberculosis.]

Cause of Goitre.—SURGEON-LIEUT. E. E. WATERS (*British Medical Journal*, September 11, 1897) communicates some interesting facts concerning the causation of goitre in a district in India 2000 feet above sea-level, which point strongly to an organic rather than a mineral cause. The soil is extremely porous. The water contains no more than a moderate amount of organic matter and mineral constituents, is soft or moderately hard, and, except for minute traces, is free from iron.

The inhabitants, who live under the same climatic conditions, but with different occupations, may be divided into two classes: the native Bhtias and the Sepoy troops from the northwest provinces. The former are carriers and coolies; they are omnivorous, but by reason of poverty, mostly vegetarians. Their chief diseases are goitre, syphilis, and malaria. The temporary inhabitants, the Sepoys, are all vegetarians, and are a healthy lot, practically

free from syphilis, and living under excellent hygienic conditions. They had been in the district twenty months. Examination of 169 Bhutias showed that over 75 per cent. had goitre; nearly 90 per cent. of those over twelve years of age were afflicted. Of 380 Sepoys examined, 54 per cent. had goitre. The Bhutias say that their goitres increase during the rainy season, and this is borne out by the out-patient register and regimental admission-book for 1895. All the British officers, also, during the preceding rainy season had suffered from enlarged thyroids. Their drinking-water was passed through a Pasteur filter; all other water used was taken as tea or soda.

Taking up the several conditions which have been alleged as the cause of the process, he shows them, one after the other, to be not at fault in this particular district. Iron is present in the water only in very minute quantities, and the highest degree of permanent hardness was but three and a half. As to lime as a cause, it appears that many of the Bhutias without goitres are great lime eaters, while of the Sepoys, who never touch it, over 50 per cent. had developed goitres within twenty months after arrival. The theory that the disease is due to carrying heavy loads up and down hills might satisfy in the case of the Bhutias, but not in that of the Sepoys, who, though not carriers, yet have goitre. Further, as to age, it appears that 55 per cent. of the children under twelve had no goitres after living there always, or about the same percentage as did develop them among the Sepoys after a visit of only twenty months. He believes the disease to be due to an organism of an amœba type, and resembling the malaria organism, with a selective power against the thyroid or its secretion. For a time the system opposes it, and sometimes successfully, but when it overpowers the phagocytic resources of the system, the thyroid enlarges in the effort to combat the poison. Under thyroid feeding (two five-grain tabloids daily) the records show a weekly diminution of a quarter to half an inch in the circumference of the Sepoys' necks, and when the treatment ceases the gland again increases in size. That is to say, additional resisting power is administered in the shape of thyroid tabloids which keep the poison in check and allow the gland to recover its normal size, but on withdrawing the accessory agent there is diminished resistance and again an increase in size.

[Italian investigators advanced, in 1890, a theory that the disease was due to a bacillus, since they had found constant contamination and great bacterial richness in all waters examined in districts where goitre is endemic, and had succeeded in producing goitres experimentally with the water.]

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ALBUMINURIA IN LIFE INSURANCE.¹

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By the term albuminuria is meant a solution of serum-albumin and serum-globulin in the urine. No other proteids should be included. The proportion of these two substances varies in different cases, but when one is present the other is also. Therefore, hereafter, when we speak of albumin in the urine, let us remember that for the purposes of this paper we include both serum-albumin and serum-globulin. The sources of the albumin may be quite various. When the urine is mixed with blood, it always contains albumin. This blood may come from menstruation or from any part of the genito-urinary tract. Similarly, the presence of pus, unless in very small quantity, will cause an appreciable amount of albumin in the urine. Albuminuria may, therefore, originate in the urethra, the bladder, the ureters, the kidneys, or even in the genital appendages. By far the most common source is the kidneys, and in this paper the term albuminuria will be limited strictly to that of renal origin. The quantity of albumin varies from the faintest trace, shown only by the most delicate tests, to an amount equal to 1 or 2 per cent. of dry albumin. The quantity is not at all indicative of the gravity of a case. Many mild and curable cases show much albumin, while, on the other hand, it is well known that one form of chronic Bright's disease seldom has more than a trace, and occasionally none at all.

Following the old story, let us now "catch our rabbit." The tests for albumin are many, and their number increases daily. When the amount

¹ Read before the Section on Practice, New York Academy of Medicine, January 18, 1898.

is more than a decided trace, sufficient in fact to give an immediate reaction in Heller's test, the problem is simple. But when the amount is less than this it becomes more complicated and fraught with many chances for mistakes. Some of the tests are very delicate, indicating one part of albumin in two or even three hundred thousand. This leaves nothing to be desired on that score, but unfortunately the agents employed in such tests are apt to react with other substances which may be present in the urine. The most common cause of error is undoubtedly nucleo-proteid. This is a proteid probably arising from cell-disintegration, and in my experience it is very frequently found in the urine, usually in small quantity. Up to a few years ago it was confounded with mucin, owing to its viscosity and some other physical properties. But Halliberton, in the *Goulstonian Lectures for 1893*,¹ makes the following statement :

"More recently still it has been shown that the mucinoid substance in the mucus of the urine is not mucin at all, but another nucleo-albumin shed out from the cells of the urinary tract. The resemblance of mucin to the nucleins and nucleo-albumins has been a stumbling-block from the very commencement, and the solubilities of the two substances are so similar that there will always be a liability to confuse them."

It is readily precipitated by nearly all organic acids, either diffused or by a contact-test. It is also precipitated to some extent from acid urine by boiling. These statements cast grave doubts upon the accuracy of most tests for albumin. I have tried nearly all, and do not hesitate to say that those which show marked delicacy of reaction have obtained this at the expense of accuracy. In fact, I do not know of a single test which is an infallible indicator of albumin. Sweeping as this statement is, I am prepared to defend it after a long and at times painful experience. Let us pray for the speedy coming of that bright genius who will devise a test for albumin that is at once simple, delicate, and accurate. My own practice is to use a combination of two tests. Unless the urine is distinctly acid, it should first be made so by adding two or three drops of acetic acid. The upper layer in a large test-tube is then boiled and compared in good daylight against a dark background with the lower layers. A very slight opacity in the upper layers can readily be detected. As this is my delicate test, if no reaction is given I lay the specimen aside, satisfied that there is present no albumin of clinical importance. If a reaction does show, a few drops of nitric acid are added. If the opacity does not then disappear entirely, we can be certain of the presence of albumin or nucleo-proteid. In order to differentiate these, I resort to the well-known Heller's test. In spite of the gibes

¹ British Medical Journal, 1893, i. p. 575. In a later communication in the Journal of Physiology, 1895, xviii. p. 306, he calls this class of bodies nucleo-proteids, and that expression seems to be preferable.

and flings made at this by most analysts, it is probably used more than all the other tests. I think this popularity can be attributed to its accuracy, as the sharply defined contact-reaction with albumin is only simulated with certain oleoresins. As ordinarily applied, it is not very delicate. It becomes much more valuable if we let it stand for twenty minutes or half an hour, and is then but little inferior to the most delicate tests. Instead of the boiling, I sometimes use the potassium ferrocyanide test, or I may use both. But I always check the results, if positive, with Heller's test, and depend largely, though not entirely, upon this for an affirmative reply in a questionable case of albuminuria. I have no doubt that five years ago I called most nucleo-proteid true albumin, and condemned many a man to exile or death. During these last eight or nine years I have had a very large practice in testing urine, and theoretically my ability to determine the infinitesimal trace of albumin should have increased. I do not think my hand has lost its cunning or my eye its sharpness. Nevertheless, the proportion of cases of albuminuria has fallen from 10 per cent. eight years ago to 5.5 per cent. in the first six months of 1897. It is true that eight years ago we were in the midst of an epidemic of influenza, and this must be regarded as a frequent cause of temporary albuminuria. But, even making allowance for this, the lessened frequency of albuminuria in my experience should be considered as due to my increased ability to differentiate true and false reactions.

Clinically, cases of albuminuria can be divided into two great classes, temporary and permanent. The temporary, or transient, cases can be further divided into organic and functional. Of course, the use of the word "functional" in this connection can be disputed, as has often been done, and undoubtedly there is no sharp line dividing the two sets of cases. But the classification is a convenient one, and understood by most without the need of elaborate definition. Among the organic cases of transient albuminuria, the varieties of acute nephritis furnish the most marked examples. These are occasionally primary, but usually secondary to some other disease. The recovery from them is frequently prompt and complete, leaving behind no more sequels than are left after acute lobar pneumonia. But these are not the cases one often sees applying for life insurance. Most of the latter would be classified as functional, and can be subdivided into several varieties :

1. *The cyclical variety.* In this the albumin is very scanty, or absent entirely, in the urine first passed in the morning. It then increases, slowly or rapidly, till a certain time, usually in the forenoon, and thereafter becomes somewhat less during the rest of the day, and sometimes disappears entirely. These cases are frequently anæmic and dyspeptic, generally nervous and out of sorts. It is a curious fact that most cases of Bright's disease show a daily variation in the amount of albumin,

and the urine passed in the morning immediately after rising usually contains much less albumin than that secreted at other times. For this reason I never use such urine for analytical purposes in those cases.

2. *The dietetic variety.* In this the albuminuria is supposed to be caused by certain articles of food, especially the highly nitrogenous, such as milk, eggs, etc. I have never seen a case which I felt was certainly in this class. In some cases recurrent dyspepsia seems to have been associated with recurrent albuminuria, but the latter was not dependent on the particular food eaten.

3. *The muscular variety.* The albuminuria in this is caused by severe muscular exercise. The quantity of albumin varies, and is sometimes considerable. It comes on very soon after the exercise, and lasts usually for days, sometimes weeks. In this era of football and bicycling, it is quite common. I have usually found it in persons under thirty years, probably on account of its origin; but it may occur in those much older.

4. The albuminuria of adolescence, as its name implies, is that variety found in the young between the ages of fifteen and twenty-two or twenty-three years. It is quite common among boys, to whom my experience has been limited. These boys are sometimes anæmic and below par, but frequently they are in robust health apparently. Sometimes the urine is concentrated and loaded with urates, as Da Costa has shown; but in many cases it seems to be normal except for the presence of albumin. The albuminuria may persist in these cases for a long time without causing permanent trouble. In one case I first noticed albumin at the age of seventeen. The boy was tall and slender, and, though not robust, was hardy and did all that boys of that age usually do in the line of sports, exercise, exposure, and various small indiscretions. After persisting steadily for two years, the albuminuria gradually improved and then assumed the muscular type. It lasted in that form for about three years, and then disappeared entirely three years ago. Although I have repeatedly examined the urine since then, I have not found any albumin. As this is frequently the age of aggressive sexual development, there is apt to be present congestion of the prostate and other accessory genital organs, with the consequent elaboration of much nucleo-proteid. Hence we must always be on our guard against a mistake in analysis in this particular class of cases.

5. A variety of albuminuria, apparently due to the irritation of concentrated urine, may occur at older ages. Kidneys in perfect health, however, seem to stand great concentration of urine without leaking albumin. Even though the analogy does not hold, it is well to remember that birds and reptiles secrete a urine so concentrated that it is practically solid. On the other hand, the nature of the irritant doubtless is a factor. Thus the persistent excretion of saccharine urine frequently causes albuminuria, and sometimes even chronic nephritis.

6. Another variety of transient albuminuria is that which is associated with influenza and ordinary colds. This is quite common in my experience. It usually lasts only a short time, disappearing a few days after the acute febrile disturbance has ceased.

I have no doubt that there are other varieties of transient albuminuria beside these which have been mentioned. There certainly are many cases which cannot be arranged under any of these classes, and some of them seem to have no cause whatever.

What is the clinical significance of the albuminuria in these numerous varieties which we have grouped together as transient? In the first place, I think we should regard all albuminuria, whether transient or permanent, as pathological. Some authorities speak of physiological albuminuria, but that is a misnomer. Albuminuria is no more physiological than a heart-murmur of anæmia, or an intermittent pulse, or an acute bronchitis. Any of these conditions can disappear promptly, and thoroughly, leaving the individual in sound health; but while they exist, no one would call him in a normal physiological condition. So with albuminuria. It may disappear entirely and permanently, and never recur, but when present the condition is abnormal. If we fail to find in many of these cases any evidence of inflammation or other organic change of the kidney, we must still regard the condition as one of disease, although our knowledge of them should prevent us from making too dismal a prognosis, as was done in the days when albuminuria was synonymous with Bright's disease.

Have we any means of distinguishing the mild cases with a good prognosis, from the more serious forms? I know of none except the continued absence of albumin from the urine. In other words, as long as albuminuria is present, I fear the possibilities of the case developing some serious organic mischief. Do not let us forget, either, the wonders that treatment can accomplish in Bright's disease for a limited time. We have all seen cases in which albumin disappeared from the urine for months under careful diet and regimen and suitable medication. On the other hand, there are certain conditions, coexistent with apparent good health, which must be regarded as potential factors for the bad in cases which we may be tempted to consider functional.

1. The longer the albuminuria persists, the greater is the probability of its organic origin. If it has lasted continuously for more than a year, the prospect is very doubtful, but not hopeless, even then.

2. A continuous albuminuria is of more serious import than one which comes and goes, especially if we can in the latter case assign some cause which would put it among the classes previously enumerated.

3. The presence of tube-casts is usually looked upon as indicative of an organic renal trouble. Still, some authorities have reported casts in cases which they regarded as of functional origin, and these cases have

usually belonged to the variety called muscular. Besides this, Kossel has endeavored to prove that casts are perfectly innocuous at times. In spite of these attempts, in life insurance we welcome them as cheerfully as we would a rattlesnake. The presence of red blood-cells, if it can be demonstrated that they are from the kidneys, is quite conclusive of organic changes there. Some observers claim that they can differentiate renal epithelial cells with certainty from those of the bladder and ureters. Those who can perform this feat are entitled to our great respect. How they recognize them I have never been able to make out, although I have diligently analyzed the rather vague differential points laid down.

4. The persistence of a specific gravity lower than a thousand and fifteen is a bad prognostic in any case of albuminuria. It is apt to indicate a renal insufficiency, and these cases are much less amenable to treatment than those in which we find the specific gravity a thousand and twenty-five or higher. If we further demonstrate renal insufficiency by determining that the amount of urea daily excreted is less than normal, the indication, of course, is still more serious.

5. A hard pulse with an accentuated sound of closure of the aortic valves is distinctly prejudicial. An increased arterial tension is thus shown which may indicate the beginning of arterio-capillary fibrosis, or which may be due to the stimulation and consequent narrowing of the arterioles by blood from which the irritant excrementitious products have not been properly removed. In either case, the sign is a bad one, as it points to something more than a functional disturbance.

6. Headaches do not occur in perfect health, and, therefore, mention of them may be considered outside the limit of this paper. They are so common, however, that I wish to draw attention to them when associated with albuminuria. They must be regarded in this connection as an evil omen, if they are at all frequent or severe.

7. The age of the patient is a point of much consequence. The younger the case, down to childhood, the more apt it is to be a functional case, and the better the chances of speedy and complete recovery. If the age is over forty, the prospects are much dimmed, and I regard such cases with suspicion, which increases with every year, both of age and my experience. The highest age at which I have found albuminuria in a man otherwise apparently healthy has been seventy-two. He was sound in all respects but this, and had no ear-marks of organic disease, but two tests on successive days showed the presence of a trace of albumin. Unfortunately, I lost track of him, and cannot say what the outcome was.

8. Extremes of weight, both high and low, are prejudicial in albuminuria, as in most other diseased conditions. We are apt to find light weight associated with albuminuria of the young, and in many of these

eases it seems to be due to the latter. On the other hand, over-weight with albuminuria is apt to occur in persons over thirty, and is, I think, of graver significance than under-weight, as the same causes which have produced the obesity have probably occasioned also organic changes in the kidney.

9. The use of alcoholies beyond the most moderate extent is unfavorable in cases of albuminuria. Certainly, if the amount taken is in the neighborhood of Anstie's limit, or if there are occasional excesses, the prospects are not good for the ultimate disappearance of the albumin.

These are the factors which have occurred to me as influencing the prognosis in cases of albuminuria. With the possible exception of headaches, they are all consistent with good health, and they might all be present in an individual who was still apparently in good health. Of course, the complication of albuminuria with any disease is serious, but with that our discussion has nothing to do.

There remains still one class of cases which come within our definition, and which must now be considered. I refer to those cases in which the albuminuria is steadily persistent, although the individual is apparently in good health otherwise. We have all met such cases, and they are certainly very puzzling. On account of these the cry of "physiological" albuminuria has been loudest raised, and here it is most difficult to meet. In these the amount of albumin is usually reported as very small, or a trace, and most of them are doubtless cases in which nucleo-proteid has been mistaken for genuine albumin. But this is not so of all, and an ingenious hypothesis (I have tried in vain to recall where or by whom first advanced) endeavors to account for them. It is as follows: An acute nephritis has occurred and passed away, leaving a limited portion of one or both kidneys altered. This lesion is permanent, but non-progressive. The sound portion of the kidneys is capable of doing all the excretory work necessary, and does it; while the damaged portion permits the constant transudation of albumin. This is certainly very plausible, but is unsupported by any investigations post mortem, so far as I know. I do not offer this theory as an excuse for the statement that I regard all these cases as pathological. They are not healthy, however much they may seem to be. They may not have any organic lesion of the kidney, and they may not die of any functional disease of that organ; but in our work we must look further than this. Do they as a class live as long as they would if entirely healthy? If some can recall cases of albuminuria which have lasted for ten or fifteen years, we must remind them that the expectation of life at thirty is thirty-five years, at forty it is twenty-seven years, and even at fifty it is twenty years. If pneumonia, erysipelas, typhoid fever, or any serious disease takes hold of such a case, is his chance of recovery as good as if he had been sound? I, for one, will give a negative reply to both these ques-

tions. But these cases of permanent albuminuria must not be confounded with those in which the albuminuria is transient. Here the prognosis is good, and as soon as the albuminuria disappears and stays away for a reasonable length of time we can regard such a case as healthy as if he had had simply an attack of functional dyspepsia.

It has been suggested that all cases of albuminuria could be insured by charging them all an extra premium, which could be so equalized that no loss would accrue to the company. This is undoubtedly true; but think how manifestly unjust it would be to the cases of transient albuminuria, who would thus be forced to pay extra, when in a few months or even weeks they might be considered in such good health as to be charged only the regular rates. It would be like accepting all cases of cough at an extra premium—a splendid opportunity for consumptives and cases of emphysema, but very harsh treatment for ordinary colds and acute bronchitis.

AMŒBIC DYSENTERY.¹

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SINCE the announcement of the discovery of the amœbæ coli in the United States by Osler, quickly followed by confirmatory reports from various sources of the presence of these organisms in the fecal discharges in cases of chronic dysentery, the subject of amœbic dysentery has assumed considerable importance. Lamb² was the first observer who noted the occurrence of rhizopods as human parasites, but his descriptions of the organisms which he observed show beyond doubt that they differ in many essential particulars from the one subsequently described by Loesch³ and others. He found amœboid bodies and other members of the above group in the mucus from the bowel of a child dead of enteritis in 1859. Following this studies were made by Loesch, who found amœbæ in the stools in a case of ulcerative inflammation of the colon. This case, which was in every way a typical one, originated in St. Petersburg. He produced the disease in a dog by rectal injections of the fresh stools from this case. Kartulis,⁴ in Egypt, found amœbæ present in the stools of over 500 cases of both acute and chronic dysen-

¹ Read by invitation before the Nashville Academy of Medicine.

² Lamb: Beobacht. u. Stud. aus den Franz-Josef-Kinder-Spital, 1860.

³ Loesch: "Massenhafte Entwicklung von Amœben im Dickdarm." Virch. Arch., Bd. lxx.

⁴ Kartulis: "Zur Aetiologie der Dysenterie in Aegypten." Virchow's Archiv, 1885, Bd. lxi.; "Ueber tropische Leberabscesse und ihr Verhältniss zur Dysenterie." Virchow's Archiv, 1889, Bd. cxviii.; "Zur Aetiologie der Leberabscesse. Lebende Dysenterie Amœben im Eiter der dysenterischen Leberabscesse." Centralblatt f. Bakteriologie, 1887, Bd. xl.; "Ueber weitere Verbreitungsgebiete der Dysenterie Amœben." Centralblatt für Bakteriologie, 1899, Bd. vii.

tery. In twelve post-mortems the amœbæ were present in the ulcers in every case. He further studied microscopically the contents of twenty-two liver-abscesses, and found amœbæ present in all. Later he reports two cases originating in Athens. He also produced the disease in dogs and cats by rectal injections of the stools and both pure and contaminated cultures of the amœbæ. Massiutin¹ has, at Kiev, studied the question under Loesch's supervision. He found amœbæ, resembling in every particular those described by Kartulis, in the stools of five patients: one a case of chronic dysentery of several years' standing; the second, a man with chronic intestinal catarrh; a third, a case of typhoid fever with late diarrhœa and much mucus in the stools; the fourth and fifth were cases of diarrhœa with fluid, mucoid stools. He doubts their connection with the intestinal lesions. Hlava² found amœbæ in sixty cases of dysentery at Prague. He produced the disease in both cats and dogs by injecting stools containing amœbæ. Cases were also reported by Cahen,³ of Graz, and Nasse,⁴ of Berlin. Osler⁵ was the first to describe the amœbæ coli in this country. He found amœbæ present in the pus of a liver-abscess complicating chronic dysentery; the amœbæ were also found in the stools. The patient, who was a physician, contracted the disease while a resident in Panama some years before. Quickly following Osler's paper reports of cases of this disease came from various parts of this country. Stengel⁶ claimed to have found amœbæ in three cases of acute dysentery in Philadelphia, and a short time after Musser⁷ reported four cases from the same city. Rhein,⁸ also of Philadelphia, mentions that he found amœbæ in fifteen cases of dysentery, but gave no details. Dock⁹ was the first to find amœbic dysentery in the South, he having reported twelve cases of both acute and chronic forms of this disease occurring in and about Galveston. In a letter, Dr. Dock informs me that before leaving Texas he saw five more cases, but has searched in vain for amœbæ at his present location in Ann Arbor, Mich. Eichberg,¹⁰ of Cincinnati, reported a case of liver-abscess in the pus of which many amœbæ were found, but no bacteria. In the stools amœbæ were also present in moderate numbers. He also mentions that amœbæ have been found in two other cases of hepatic abscess, occurring, presumably, in Cincinnati. Lutz¹¹ has reported three cases from Brazil, and has added

¹ Massiutin: *Centralblatt f. Bakteriologie*, 1887, Bd. vi.

² Hlava: *Centralblatt f. Bakteriologie*, 1887, Bd. i.

³ Cahen: *Deutsche med. Wochenschrift*, July 2, 1891.

⁴ Nasse: *Deutsche med. Wochenschrift*, July 9, 1891.

⁵ Osler: *Bulletin of the Johns Hopkins Hospital*, 1890, i.

⁶ Stengel: *Medical News*, November 15, 1890.

⁷ Musser: *University Medical Magazine*, December, 1890.

⁸ Rhein: *Medical News*, January 9, 1892.

⁹ Dock: *Texas Medical Journal*, April, 1891.

¹⁰ Eichberg: *Medical News*, August 22, 1891.

¹¹ Lutz: *Zur Kenntniss der Amœbenenteritis*. *Centralblatt f. Bakt.*, 1891, x.

some just criticisms of our inexact classifications of intestinal affections. Wasdin¹ reports a case of dysentery, with autopsy from Charleston, in which many amœbæ were found in the stools and intestinal contents. This case originated in Savannah, and was thought to have resulted from drinking Savannah river-water. I reported² three cases of chronic dysentery, with the usual symptoms, in the stools of which amœbæ were found in large numbers, differing in no essential particular from those described by Osler, Dock, and others. Fitz and Gerry³ report a case of dysentery, with amœbæ in the stools, occurring near Boston. Preston and Ruhräh⁴ report a case of amœbic dysentery from Baltimore; the patient spontaneously recovered. Stockton⁵ reported a case from Buffalo in 1894. Wilson,⁶ of Birmingham, recently reported four typical cases of this disease. A very interesting case of abscess of the liver, which contained amœbæ, complicating amœbic dysentery in a negro boy, has been reported by Slaughter,⁷ of Theological Seminary, Virginia. Lewis⁸ has recently reported a case from Baltimore.

Within the last two or three years numerous articles have been published, both in this country and abroad, on this subject. From England a case has been reported by Curnow,⁹ which originated in India; others who have written on this subject are Tenoglia,¹⁰ Wesener,¹¹ Kovács,¹² Epstein,¹³ Posner,¹⁴ Schuberg,¹⁵ Kruse and Pasquale,¹⁶ Roos,¹⁷ Vivalvi,¹⁸ Celli and Fiocca,¹⁹ and Manner.²⁰

By far, however, the most valuable contribution which has been made to this subject is the monograph of Councilman and Lafleur,²¹ at that time of the Johns Hopkins Hospital.

As a basis for their study they reported fifteen cases (Osler's case included), with autopsies in eight. These careful observers conclude as a result of their studies, together with those of Loesch, Kartulis, Hlava, and others, that the form of dysentery especially characterized by the

¹ Wasdin: *Ibid.*, December 5, 1891.

² Harris: *Ibid.*, December 3, 1892.

³ Fitz and Gerry: *Boston Medical and Surgical Journal*, December 3, 1891.

⁴ Preston and Ruhräh: *New York Medical Journal*, November 10, 1894.

⁵ Stockton: *International Clinics*, 1894, I.

⁶ Wilson: *Johns Hopkins Hospital Bulletin*, September and October, 1895.

⁷ Slaughter: *Virginia Medical Monthly*, October, 1895.

⁸ Lewis: *Maryland Medical Journal*, June 13, 1896.

⁹ Curnow: *Leonard's Illustrated Medical Journal*, January, 1896.

¹⁰ Tenoglia: *Entero-Colite par amœba coli*. *Archiv. ital. de biol.*, 1890, xiv.

¹¹ Wesener: *Centralblatt f. allg. path.*, 1892, iii.

¹² Kovács: *Beobacht. über Amœbendysenterie*. *Zeitschr. f. Heilk.*, 1892, xiii.

¹³ Epstein: *Prag. med. Wochenschrift*, 1893.

¹⁴ Posner: *Berliner klinische Wochenschrift*, 1893.

¹⁵ Schuberg: *Centralblatt f. Bakt.*, 1893, xiii.

¹⁶ Kruse and Pasquale: *Zeitsch. f. Hyg.*, 1894, xvi.

¹⁷ Roos: *Arch. f. exp. Path.*, 1894, xxxiii.

¹⁸ Vivalvi: *Riforma Med.*, 1894, No. 135.

¹⁹ Celli and Fiocca: *Centralblatt f. Bakt.*, 1890, Bd. ix. u. x.

²⁰ Manner: *Wiener klinische Wochenschrift*, February 20, 1896.

²¹ Councilman and Lafleur: *Johns Hopkins Hospital Reports*, II., Nos. 7, 8, and 9.

amœbæ in the stools "is a form of dysentery which etiologically, clinically, and anatomically should be regarded as a distinct disease."

My observations on this disease embrace the clinical study of thirty-five¹ cases—the details in three having been already published—and the post-mortem appearances in five.

Below is given a brief *résumé* of the clinical histories of these cases, the complete details being rather too tedious for publication. I desire to emphasize the fact that most of my cases were chronic. Thirty-one of my thirty-five patients with this disease were born in America, and four were of foreign birth. Of the former, eighteen were white and thirteen were negroes. Of the latter, all were Russian Jews. Of the thirty-five patients, four were under ten years of age, five from ten to twenty, five from twenty to thirty, eleven from thirty to forty, six from forty to fifty, and four from fifty to sixty at the time of the onset of the disease. Thirty of the patients contracted the disease in Atlanta Ga.; one in Decatur, Ga.; one in Athens, Ga.; one in Talladega, Ala. and two in Chattanooga, Tenn. Six lived in fairly healthy localities, while twenty-four resided in very unhealthy localities; the conditions under which five lived were not known, but with one exception were probably bad. Four denied drinking well-water at all, while thirty obtained their drinking-water from surface wells; in one case nothing was learned of the source of water-supply. In two instances two of the patients were taken simultaneously while living in the same house, and in one instance three were taken under the same circumstances. Twelve were laborers; many of the women had no occupation, and several worked at the ordinary trades. With but few exceptions the patients were from the lower walks of life. Nothing of importance developed from inquiries as to their family histories. Six had had dysentery before.

Of the thirty-five cases two were developed in March, one in April, seven in May, five in June, five in July, seven in August, four in September, and four in December. In eighteen of the cases the onset was slow, and in sixteen the disease began as a severe dysentery; the nature of the onset in one case was not determined. Twenty-three lost flesh decidedly.

After the disease becomes chronic the temperature is usually slightly elevated, especially at night, but rarely goes above 101° F. Both pulse and respiration are normal, or but little accelerated. The tongue was more or less coated in twenty-five cases; it was also often slightly reddened at the edges. Oedema was noted under the eyes in two cases, and under both eyes and around the ankles in four. In eight instances the abdomen was distended; in one it was retracted; it was tender in eighteen instances.

¹ Five of these cases were seen after the paper was read.

Sugar was not found in the urine of any of the cases, and albumin only once. Peptones, albumose, and globulin were carefully searched for in several bad cases, but none found. When the stools are excessively watery and copious, chlorides largely disappear from the urine; in one case there was total suppression of chlorides for a time. The number of stools vary from two to forty, or even more, in twenty-four hours. They vary in consistency with the varying severity of the disease. In nine cases they were very watery; in three, semi-fluid; in twenty-one, semi-solid; in one, nearly solid; and in one case undetermined. In color they vary somewhat, but in over half of the cases they were pink, reddish, or reddish-brown; rarely are they of the normal yellow color. With scarcely an exception, they were exceedingly offensive. The reaction in the first few cases was not determined, but subsequently all examined were found alkaline, except in two instances. In six analyses of the stools in two severe cases large quantities of serum albumin were found, and small amounts of peptones (Hofmeister's method) were found present in each specimen examined. Neither globulin nor albumose was found, but that small quantities were present can scarcely be doubted. Chlorides were largely present. On microscopic examination, all were found to contain, in addition to the usual undigested particles of food, pus-cells, more or less red cells, large epithelioid cells, multitudes of bacteria, and amœbæ. In six instances *Cereomonas* were found, and in one *Trichomonas*; in one case (a child) the eggs of *Oxyuris vermiculosis* were found.

All complained of more or less griping and frequent desire to go to stool. Abdomen was more or less constantly painful in fourteen instances, and eight complained of backache; the backache was continuous in some of the cases, but in others intermittent—in two cases being aggravated by the recumbent posture. Four of the patients complained of nausea and vomiting, three of night-sweats, and five of fever and thirst. Obstinate hiccough was observed twice preceding death.

As complications, liver-abscess occurred twice, peritonitis twice, piles once, and appendicitis once.

Ten were treated with the ordinary astringents; two of these recovered, five died, and the result in three is unknown; one of the recoveries occurred while the patient was taking bismuth subnitrate and opium, and in the other case the result was spontaneous. Twenty-five were treated by rectal injections of solutions of hydrogen dioxide; eight recovered, four improved, two were not benefited, five died, and the result in six unknown. One recovered under injections of solutions of potassium permanganate, and another recovered while under the care of another physician. Of my thirty-five cases twelve recovered, four improved, nine died, and the result in ten is unknown.

Like the symptoms and the effects of treatment, the duration is ex-

tremely variable; one case died in eleven days; when last heard from, some had existed half as many years.

ETIOLOGY. Amœbic dysentery is a disease pre-eminently of the poor, and is almost always associated with filth, bad hygienic surroundings, and lack of proper food; hence it is that it is very rare in the country and smaller towns, but here the catarrhal form is quite frequent. Where the matter has been inquired into, it has been also found that, in a large proportion of cases, the patients had been more or less in the habit of drinking surface drainage water from wells; this was found to be true in thirty out of my thirty-five cases. As a predisposing cause, race seems to be an important factor, as out of the seventy-eight cases reported in this country (the ones I now report being included), only eighteen have occurred in the colored race. A considerable number have also occurred in foreigners. The infrequency with which it occurs in children and young adults is very remarkable—the proportion being about ten grown persons to one under twenty-one years of age. It seems to occur in males about three times as frequently as in females. Although it occasionally begins in the winter, the onset is almost invariably in the summer months—especially in May, June, July, and August. In this it differs markedly from the catarrhal form, which, in the South, is certainly more frequent in the early spring months. Attempts to connect any special form of bacterial life with this disease have heretofore proved futile, but a parasite belonging to the great group of protozoa has been found in the intestinal lesions with great uniformity. It cannot be denied, however, that positive proof of the etiologic relation of these organisms is still wanting; but when we consider that amœbæ, the descriptions of which, from all sources, differ very slightly, have been found constantly present in the stools of a common, chronic, and very fatal form of dysentery, in various parts of Europe, Asia, Africa, and in both North and South America, and that they occur in the stools of other diseases certainly very rarely—which might be easily accounted for by supposing some complicating amœbic pathological process—it is strong presumptive evidence that they play an important rôle in the production of the pathologic changes which occur in this disease; when we further consider that competent observers have always succeeded in demonstrating these organisms in and around the ulcers which occur in the colon, and that one observer, by the rectal injection of cultures of the amœbæ, has produced inflammation and erosion of the mucous membrane of the large intestine of lower animals, the evidence becomes even stronger that they are the active causative agents in this affection. Further, large numbers of amœbæ—sometimes occurring in pure cultures—are found in abscesses of the liver and lungs, complicating amœbic dysentery. Flexner,¹ in

¹ Flexner: Johns Hopkins Bulletin, September, 1892.

a very interesting article, describes amœbæ occurring in the pus from an abscess of the lower jaw, which he regards as "allied species if not identical" with the amœbæ dysentericæ.

In collecting the feces for examination for the amœbæ, some precautions are necessary to prevent the death of these organisms before the examination is made, as, when dead, they resemble very much the large epithelioid cells which often occur so abundantly in dysenteric stools; the stools should be received directly in a perfectly clean vessel, which in cold weather may be warmed, and should contain no water or other fluids, urine being especially damaging. The amœbæ are from twelve to thirty-six micromillimetres in diameter. Generally the body of an amœba can be distinguished as being made up of an outer, clear homogeneous substance or ectosare, and an inner, highly refractive mass or endosare; within the latter are found foreign bodies, such as bacteria, granular detritus, bodies which seem to be red blood-corpuscles, and one or more large vacuoles, and great numbers of smaller ones, giving the appearance of granulation; they are frequently found, however, with few or no vacuoles of any size. The impression has gradually grown upon me that amœbæ in each case bear a general resemblance to each other in respect to the number and size of their vacuoles, or at least it is true for comparatively lengthy periods, if not throughout the entire course of the disease. Within the vacuoles, bodies in active Brownian movement may be sometimes seen. In consistency the ectosare is semi-solid, allowing the amœbæ to push readily through the granular debris found in the feces, but the endosare must be quite liquid, for on one occasion, within the body of one of these organisms, which was almost entirely free of vacuoles, an actively moving bacillus was seen. When dead, before disintegration begins and when not active, the organisms are generally round or nearly so, but occasional exceptions are seen. When in motion almost every conceivable form is assumed, barring that the irregularities of the amœbæ body and the processes sent out are invariably rounded. Progression of the amœbæ may be accomplished by a steady crawling movement, or, what is more usual, pseudopodia are sent out, followed by the contents of the body flowing into them, which causes a rapid increase in the size of the pseudopodia and continues until the entire body changes place. While living, the amœbæ are not affected by currents under the cover-glass, but when dead they drift like other inanimate particles of matter. The cell contents frequently change place without perceptible movement of the ectosare. While moving, a collection of fecal detritus is often attached to the posterior portions of the amœbæ, and frequently I have been unable to make out the exact point of separation; indeed, it has seemed to me, at times, that there was direct continuation of one into the other. If this is true it may explain what has always puzzled me—i. e., how do the amœbæ take in their

food and the various cellular elements which are almost always found in their bodies? In this connection, the observations of Cienkowski¹ Duncan,² Leidy,³ and Cunningham⁴ on this subject are of great interest. As far as my observations go, pseudopodia are never sent out at the point at which these masses are attached to the amœbæ. The bodies of the amœbæ usually have a faint green or bluish-green color. A nucleus may sometimes be distinguished in them, but by no means always; it is usually surrounded by a white rim; they sometimes change their form slightly. No contractile vesicle was ever seen.

The length of time that they live after being passed varies considerably in each case; amœbæ from Case I.⁵ often remained alive and active for twenty-four hours in a room where the temperature fell almost to the freezing-point during the night; this, however, I regard as being very exceptional. As a general rule, they die in from two to six hours after expulsion from the intestine. Writers on this subject have claimed that temperature exerted a marked influence on the length of time which they would live, but, while believing that a temperature about that of the body is most favorable to them, I have so far seen nothing to convince me of the truth of the above conclusion. I have often noticed that, from the same case, amœbæ died about as soon at the temperature of the room as when kept at 37° C. in an incubator. My experiments to determine the toxic effects of various agents on amœbæ have been confined largely to Case I., in which, as above indicated, the amœbæ seemed unusually tenacious of life. The organisms in this case were not killed in any reasonable length of time by lowering the temperature of the fluid in which they were contained to 0° C.; neither were they seemingly at all affected by saturated solutions of quinine sulphate or boric acid—both of which have been recommended for the purpose. A 1:300 aqueous solution of quinine bisulphate invariably killed the amœbæ within ten minutes. They are killed by weak solutions of hydrogen dioxide, potassium permanganate, and toluidine blue; they are also killed by acids, even when very dilute, and for this reason, largely, the urine acts in a similar manner, but its toxic effect is not entirely due to its acidity, as I have found that after being neutralized the amœbæ do not live very long in it. Agents, rectal injections of which were likely to prove harmful to the individual, were not experimented with.

As shown by me,⁶ the amœbæ sometimes reproduce after being ex-

¹ Cienkowski: *Archiv f. mikrosk. Anatomie*, 1865, Bd. i. S. 203.

² Duncan: *Popular Science Review*, 1877, p. 217.

³ Leidy: *Fresh-water Rhizopods of North America*, p. 27.

⁴ Cunningham: *Quarterly Journal of Microscopic Science*, 1881.

⁵ For convenience, the cases are referred to in this paper in the order in which they were seen.

⁶ Harris: *Medical News*, November 24, 1894.

pelled from the intestine; multiplication takes place by direct division. Attempts to cultivate them in straw infusions, as recommended by Kartulis,¹ have always been unsuccessful.

For a long time I was unable to find a stain which would color the amœbæ in the fresh state, as they showed not the slightest tendency to take any of the ordinary dyes. Some progress was made by adding to the fresh cover-slip preparations of fecal matter a drop of an aqueous solution of acid fuchsin, which has the effect of coloring deeply all objects ordinarily found in the stools except such crystalline bodies as might be present and the amœbæ. After having discovered the great affinity that toluidine blue displayed for the fixed amœbæ, at the first opportunity I added a drop of watery solution of this substance to a small particle of the feces, and examined it immediately under the microscope; here, as in the tissues, the endosarc of the amœbæ was always intensely stained at once; the ectosarc only becoming so after the lapse of several minutes. In fresh preparations the ecto- and endosarc are beautifully differentiated. The amœbæ seemed to be instantly killed, and often their natural forms were beautifully preserved. The cover-slips, after being washed in water and mounted in Farrant's medium, may be preserved for many months, but after a time the preparations completely fade. It is evident that in addition to staining the dye also acts as a fixative. Weak solutions of the stain should be used, or the cover-slip should be washed in water before mounting. In staining the feces by this method, frequently small, vacuolated bodies were found which take the stain as do the amœbæ; these bodies are about the size of leucocytes, but differ from them in many particulars.

Attempts were made to stain the amœbæ in cover-slip preparations of the feces by first placing both the dried and moist cover-slips in various hardening and fixing solutions. Alcohol, both weak and strong, Müller's solution, strong solutions of potassium permanganate, 2 per cent. osmic acid solutions, strong and weak solutions of chromic acid, Hermann's solution, Flemming's strong solution, and Heidenhain's mercury bichloride salt solution, with a little acetic acid added, were all tried, with but very indifferent results—the last three, however, giving the best. By none of the methods were they sufficiently well preserved to present more than a very faint resemblance to these organisms when alive; none of the above agents killed rapidly enough to prevent enormous shrinkage and the bodies of the amœbæ from losing their more or less characteristic irregular form and becoming rounded. Scarcely better results were obtained from sections of fecal masses, which were treated with the above hardening agents, embedded, cut, and stained.

¹ Kartulis: "Einiges über die Pathogenese der Dysenterieamœben." *Centralblatt f. Bakteriologie*, 1891, Bd. ix.

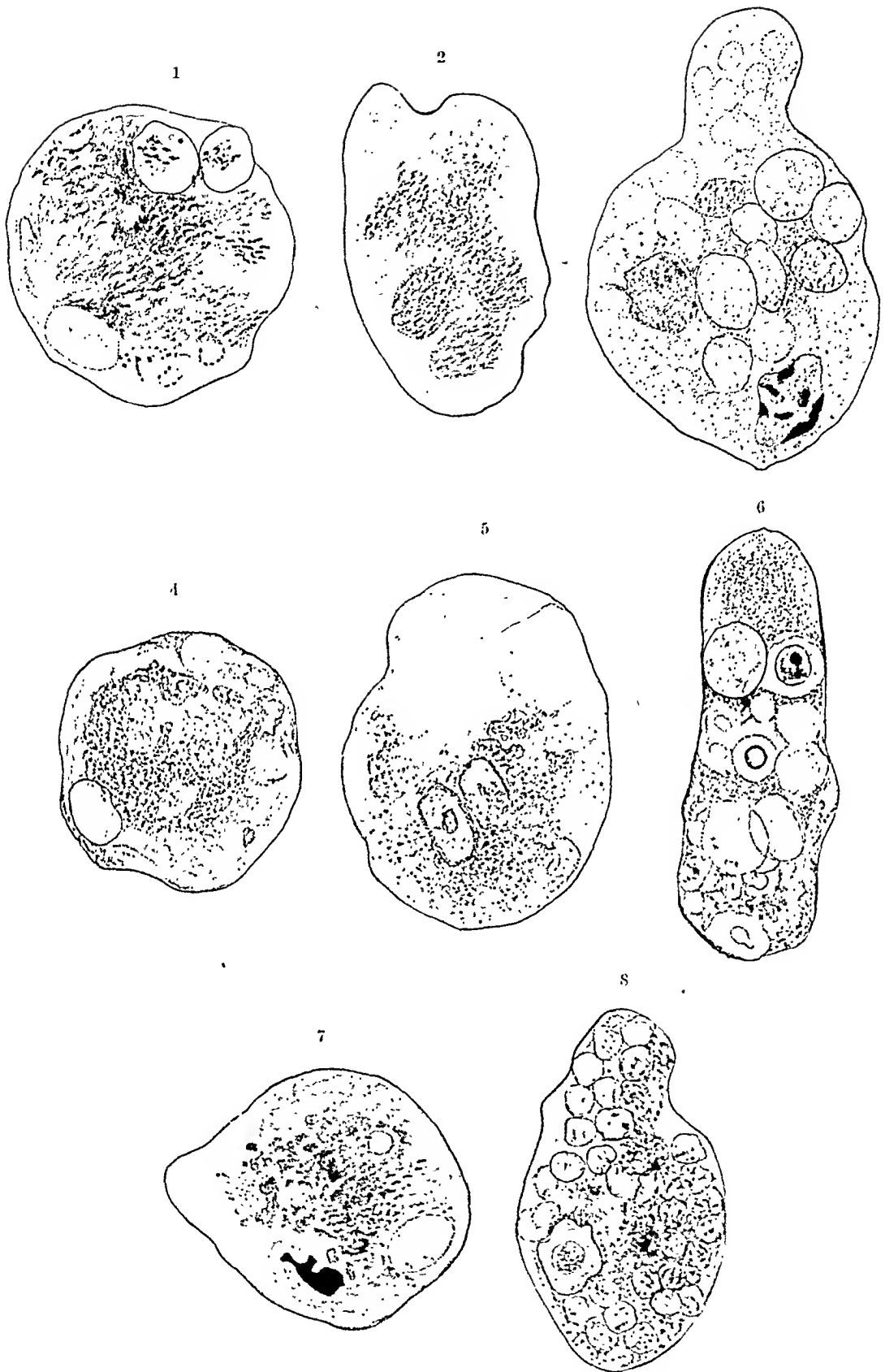
Strangely enough, and this fact is mentioned by Councilman, the amœbæ are much better preserved by hardening agents in the tissues than in the feces; but even here, in the most favorable cases, they shrink considerably, and generally lose largely their characteristic vacuolation; the only explanation of this fact which has occurred to me as being at all likely is that the solutions do not reach the amœbæ at first in so concentrated a form as when merely the feces are used; but this, it must be admitted, is a mere assumption without any real proofs, and which even seems unlikely when it is remembered that the results are practically the same whether great or small masses of feces are used.

The amœbæ were well preserved in the tissues when acidified Heidenhain's mercury bichloride salt solution, Hermann's solution, Flemming's solution, Müller's solution—made very strong and placed in the incubator for three days, as recommended by Councilman—and alcohol were used as hardening agents—the first three, as in the case of the feces, giving the best results. A large number of staining reagents were used on the tissues hardened in each of the above solutions, with varying results. Councilman states that the amœbæ are probably most easily distinguished after hardening in alcohol and staining with Loeffler's methylene blue; I would add that results quite as good, if not better, are obtained with this stain by fixing in corrosive sublimate, instead of hardening in alcohol. Now, while the amœbæ are brought out very prominently by the above stain, it is by no means to be recommended for studying the delicate internal structure of these organisms, as the entire endosare seems to take up nearly the same amount of the stain, and their bodies become so dark that the vacuoles are no longer apparent, and the nuclei are not distinguishable with certainty. The iron hæmatoxylin of Buetschli gives much the same general effect, the only difference being that they stain darker. After fixing in any of the above reagents the amœbæ are especially well stained by blue solutions of hæmatoxylin, but the same objection applies in this case as was mentioned in connection with methylene blue, namely, that the amœbæ were so intensely colored that the internal structures could not be observed; fairly good results were obtained by first staining with hæmatoxylin and after with eosin, benzopurpurin, or picric acid, the last three, however, always washing out the first rapidly. After hardening in Heidenhain's solution, they stain brilliantly in the carmines, but not quite so dark as the tissues; very beautiful and delicate stains were obtained with weak alum carmine containing a trace of osmic acid. The amœbæ stain fairly well by Bizzozero's modifications of Gram's gentian violet aniline-water method; staining first with gentian violet, and following with eosin, gives much the same effect, but I fancy somewhat better than hæmatoxylin and eosin; the nuclei are beautifully stained in this way. Nigrosin stains the bodies of the amœbæ well, but the nuclei are

not brought out. The Ehrlich-Biondi-Heidenhain stain produces delicate but very faint results. I have never seen the nucleus stained by the methylene green of this combination, but strangely, the ectosarc of the amœbæ stain faintly with this color; this stain works best with corrosive sublimate objects. Victoria blue stains the nuclei faint blue; no other part of the organism is at all colored, however. The bodies of the amœbæ stain yellow by Van Giesens' method; the nuclei are faintly stained. Very fine results were obtained by staining with carbol-fuchsin, the bodies of the amœbæ stain a beautiful purplish red, the borders and centres of the nuclei being a dark purple; the stain is perhaps somewhat more decided after hardening in osmic acid solutions. Safranin stains the endosarc a reddish color, some parts looking, however, quite dark; the irregular nuclei are stained dark in the centre and at their margins, and the ectosarc faintly red; perhaps no method shows the division of the amœbæ into endo- and ectosarc so well as this one. Equally good, if not better, results in some particulars are obtained by first staining lightly with hæmatoxylin and after with safranin, according to the method of Rabl. Flemming's orange method gives very fine results—the nuclei being very distinct and the protoplasm darker than when safranin is used alone. It is noteworthy, as is the case with the tissues, that all safranin stains are fainter and less precise when the amœbæ have been hardened with corrosive sublimate than when hardened in osmic solutions. The bodies of the amœbæ are slightly and the nuclei very decidedly stained by Weigert's fibrin stain.

Although very fine stains may be obtained by some of the above methods, decidedly the best results, so far as the internal structure of the organism is concerned, have been obtained by hardening in corrosive sublimate and staining in Heidenhain's iron alum hæmatoxylin; the method gives a dark, very transparent, and highly differentiated coloration, but permits the vacuoles to be seen as in no other stain; the nuclei are irregularly stained, being darkest on the periphery and at their centres. Furthermore, the amœbæ, when stained by this method, can be detected in the tissues almost as readily as if stained by methylene blue, and are much more easily distinguished from objects resembling them. When the above method is used the amœbæ very frequently closely resemble those in a living state, the only difference being that there is always more or less shrinkage. (Fig. 1.)

Having observed the fact, as already mentioned, that the protoplasm of the amœbæ exhibited marked affinity for the blue solutions of hæmatoxylin and methylene-blue, it occurred to me that perhaps the endosarc of the amœbæ was composed of a mucus-like substance; I therefore stained some specimens of intestine containing these organisms, which had been fixed in corrosive sublimate, with a weak watery solution of toluidin blue, and found the amœbæ were much more deeply



Amoebae and a cell from the margin of a liver abscess. Toluidin-blue and eosin; Zeiss $\frac{1}{2}$ oil immersion, Oc.C. Nos. 1, 5, and 8 were fixed in Hermann's solution; Nos. 2, 3, 4, 6, and 7 were fixed in corrosive sublimate. No. 1 was stained by Flemming's safranin, gentian-violet, and orange stain; No. 5 by Robb's haematoxylin-safranin method; No. 8, which is a degenerate liver cell, and is put here for the purpose of comparison, was stained with carbol-fuchsin. Nos. 2 and 4 were stained by Loeffler's methylene blue. Nos. 3, 6, and 7 were stained by Heidenhain's iron-haematoxylin method.

stained than the tissues. After experimenting further it was observed that a beautiful contrast stain could be produced by staining first in eosin or benzopurpurin, and after, for twenty or thirty minutes, in a weak solution of toluidin blue; the excess of the latter stain is washed out with alcohol, which usually takes three or four minutes, and the section is then cleared in cedar oil or xylol, it having been found that other clearing agents more or less injured the stain. If the sections are washed in alcohol for only a short time the amœbæ are stained a very solid dark blue, in which their nuclei can be seen stained of even a darker color, but if the washing is prolonged their bodies are not so dark and have a reddish tinge, the vacuoles becoming quite distinct, and the outer portions of the ectosarc retaining the pigment very slightly; the tissues are a purplish red, while the nuclei stain very nearly the same color as the amœbæ. If the eosin is used after the toluidin blue this stain is washed out of the amœbæ. By this method it is possible to examine with a low power a large section for these organisms in a few moments. It is certainly by far the most beautiful stain yet discovered for the amœbæ; indeed, it would be hardly possible to devise a better. It seems quite likely that the endosarc is made up of a substance greatly resembling mucin, and the inference is not without justification that the endosarc of other rhizopods and other members of the protozoa may be also composed of a like material, and may give the same reactions with toluidin blue. It kills *Cercomonas* quickly, but scarcely stains them at all. Although somewhat out of place, I would call attention to the fact that the combination of eosin and toluidin blue is a most excellent method for general histologic work, and compares favorably with the results obtained by staining with eosin and hæmatoxylin or gentian violet. Unfortunately, the stain gives differential effects only with corrosive sublimate or alcoholic objects. Other mucin stains, as thionin, mucicarmine, and mucicarmine, were tried, with excellent results, but none gave such fine effects as the toluidin blue; the results with thionin were especially good, but the stain cannot be used with eosin and the like, as it will not replace these acid dyes in the amœbæ. In this connection it may be noted that hyaline cartilage, mastzellen, and the jelly of Wharton give the same reaction with basic dyes as mucin does.

From the above, it will be seen, as should have been expected, that the bodies of the amœbæ have much more affinity for plasmatic than for nuclear stains, and that the latter are always washed out by the former. Within the bodies of the amœbæ may be generally seen some granular detritus, the result, no doubt, of cellular disintegration; but I have found it extremely difficult, after staining, to recognize with any certainty included cells. Neither have I in a single instance been able to make out the radiate-like structures described by Councilman as sometimes occurring in the protoplasm of these organisms; the fluid nature

of the endosarc would seem to make very improbable the existence of these structures during life, and when it is remembered that they were found only in tissues hardened by Flemming's solution, which contains a large proportion of chromic acid, the possibility is strongly suggested that they may be artefacts. I have never seen fat in the interior of the amœbæ.

The question as to how the amœbæ gain access to the system is one of great interest, and a perfectly satisfactory answer has, as yet, not been given. In all of the cases reported by Councilman and Lafleur the patients were drinking well-water at the time of the onset of the disease, and with but three exceptions—and even here it is a matter of doubt in two of these—the same is true of all my cases. Of great interest in this connection is the case reported by Fitz and Gerry, as these observers demonstrated the presence of amœbæ, in most respects resembling those found in the feces, in a cistern from which the patient constantly used water. A careful examination of the water used by patients in Cases XII. and XXIV. failed to reveal the presence of amœbæ; neither were they found in the mud from the bottom of the wells or scrapings from the well-bucket.

PATHOLOGICAL ANATOMY. On opening the abdominal cavity in Case IV. several localized sacs of pus were found; and from an ulcer which penetrated through the entire thickness of the gut there was a general peritonitis; this was also found in Case XIV. There was a considerable amount of pus found in the peritoneal cavity, in both cases of a whitish-yellow color. In Case IV. there were adhesions of the large intestine to all contiguous objects; the gut was much distorted, being drawn in first one direction and then another, as was also the small intestine, which was fastened to it wherever they came in contact. Most of the adhesions were old and very firm. The large intestine was at some points enormously thickened; at others so thin that it was impossible to avoid many tears during its removal. In all cases the intestinal contents consisted of a mass of foul-smelling semi-solid fecal matter, of a dark-brown color, containing particles of undigested food, blood, and much mucus. Amœbæ in the feces were sought for only in Cases XIV. and XXII., and were found in both. The characteristic lesions in this disease are the ulcers of the large intestine. These ulcers may extend almost continuously from the rectum to the ileo-cæcal valve, or may be confined to one or more limited areas. Rarely, as in Case XIV., the ulceration may extend into the small intestine. A novel feature, which I have not seen mentioned in reports of others, is that the appendix was also involved in this case. This appendage was found surrounded by pus, which contained amœbæ, was much enlarged, and was bound, for its full length, to the small intestine by firm adhesions. At one point the walls had been completely destroyed,

thus establishing a communication between its cavity and that of the surrounding abscess. On section, the appendix was found filled with thick whitish pus, in which many amœbæ were found. The ulcers are found in greater number on the lower and anterior part of the gut. It was especially noted, in all cases, at the points where the mesocolon was attached, and where the guts were fastened to the sides of the abdominal walls, that ulceration was practically absent. The ulcers are sometimes round or irregularly shaped, but are generally oblong, and lie transverse to the long axis of the colon; a form of the latter very frequently seen begins an inch or an inch and a half from the attached part of the gut, with a rounded extremity, and tapering somewhat, becoming lost near the point just named in several irregular continuations which follow the depressions between the numerous rugæ in this situation. They vary very much in size—some being no larger than the head of a pin, while others are sometimes as much as two inches in diameter. In the larger ulcers the muscular coats are frequently dissected up for some distance. These masses of muscular tissue sooner or later become detached, and are found in the stools as sloughs. In none of my cases was that honeycombing of the tissues observed that Councilman and others have described, but it was usually the case that the edges of the ulcers were somewhat undermined.

When sections of the intestine are examined with the microscope, the walls are usually found normal at a short distance from the edge of the ulcer. Approaching more closely, either one or the other of two changes may be first observed: either the submucosa shows marked changes, with the mucous membrane above practically normal, or the mucosa may be eroded and no abnormality beneath.

In the former, which is by far the more frequent, and which may be considered the typical intestinal lesion of this disease, changes in the submucosa may be traced in advance of the surface ulceration for quite a distance, thus undermining the comparatively healthy mucosa above. The appearance of these ulcers when fresh is entirely characteristic. A short distance from the point where the ulceration begins the upper portion of the glands of the mucosa are slightly but irregularly eroded. From this point to the edge of the ulcer the cells of the interglandular reticulum are usually slightly increased in number. The most careful search with high powers failed, however, to show any evidence of mitosis. At a short distance from the edge of the ulceration amœbæ are not found in the mucosa, but rarely one or two of the parasites may be seen either within or between the glands just at the margin. More or less marked fatty degeneration of the cells of the mucosa occur, which is always most intense at the edge of the ulcer. The glands contain great quantities of mucus, which become especially marked at the edge of the ulcer. Often from some part

of the margin of the ulcerated mucosa a band—usually at first small—of irregular and ill-formed mucous tissue passes off, which generally becomes larger, and may extend for considerable distances over the ulcerated submucosa, or may be reflected back over the healthy mucous surface. After passing back over the healthy mucosa these bands are often reflected back over themselves—which may be repeated several times. The large bands sometimes divide into two small ones. When growing over the ulcer they seem sometimes to become attached to its surface, but this is very rare in my cases. I have never seen epithelial cells lining the ulcers, as described by Councilman and others. Amœbæ—so rare in the healthy mucosa—are quite frequently present in these outgrowths just described, but appear to exert no influence on the growth or breaking down of these bodies. The bloodvessels of the mucosa are sometimes found greatly distended with blood; but, in my experience, this is always accomplished by a high degree of bacterial infection. At the centre of the ulcers the muscularis mucosæ is always broken down, but it suffers much less than the tissue beneath, and may be often seen to extend in a comparatively healthy condition beyond the mucosa, thus covering the broken-down tissue beneath. The above, no doubt, partially explains why the breaking down of the mucosa does not keep pace with that of the submucosa. That part of the muscularis mucosæ which hangs over the ulcer is swollen, and toward the free end the fibres are granular, and their nuclei are for the most part gone, or entirely absent. That part at the sides of the ulcer, and extending back for some distance, is swollen, and the nuclei are increased in number. Where the ulceration is recent the altered submucosa forms the base of the ulcer. The breaking down here is always irregular, giving the ulcer a ragged appearance. Often almost detached shreds of this necrotic tissue lie on the free surfaces of the ulcers. Amœbæ may sometimes be seen lying on or between these shreds, but they are rarely so numerous as deeper down and along the outer edges of the diseased tissue. The surface of the ulcer is more or less covered with a granular detritus mixed with round cells, and a few epithelial and pus cells. These are not regularly distributed, but are often collected in small masses. Bacteria were also present, but never to the extent that would be supposed. The most common organism is one that morphologically resembles and stains like the colon bacillus. The most marked and characteristic changes are always present in the submucosa. The first change is a great swelling of the tissues. Immediately following there is an infiltration with small round cells, and sometimes a few polymuclear leucocytes are also seen, but these are rare. Frequently present also are large, vacuolated, mononuclear cells, which, on account of their size and general appearance, closely resemble amœbæ. They are scattered through the tissues everywhere, but are most frequent where the disease-process is most actively advancing, and are at these points

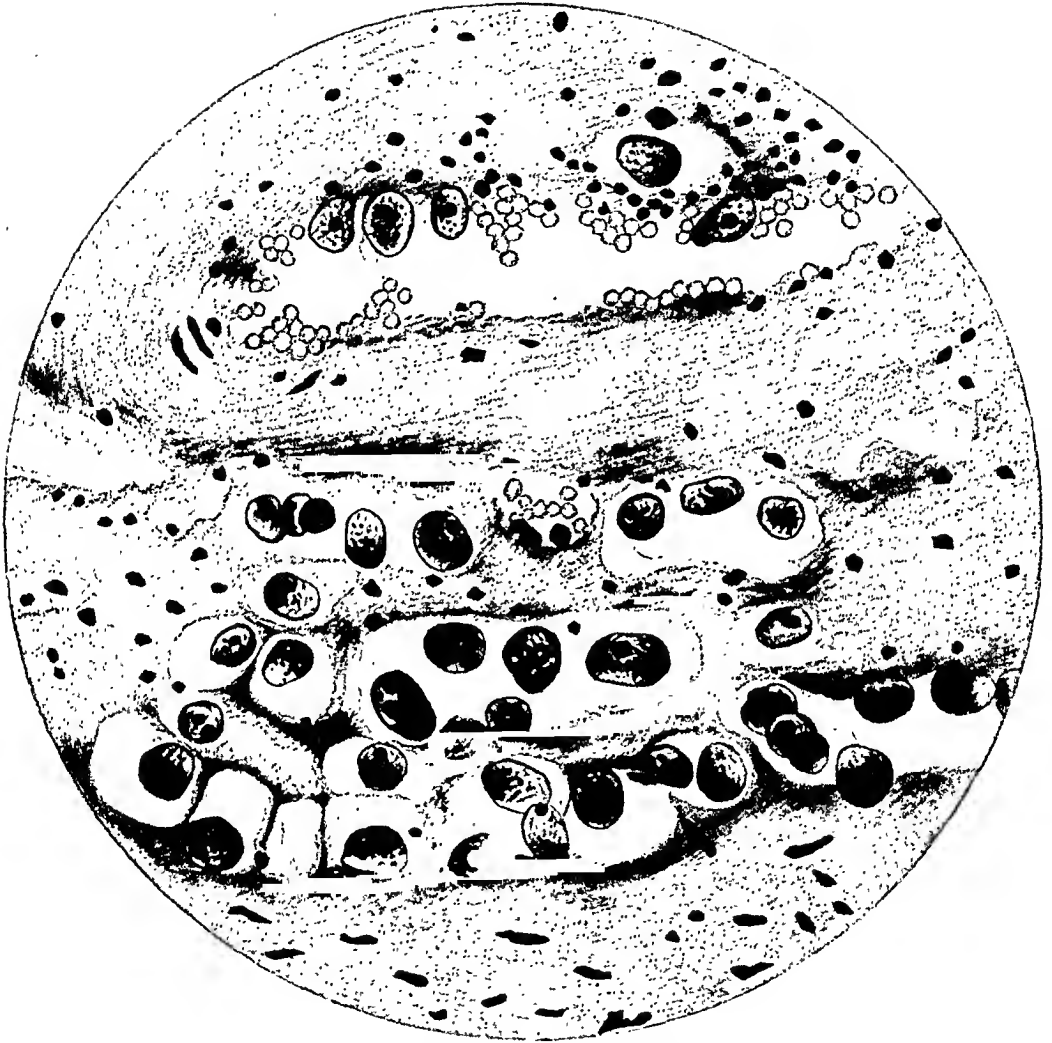
often very numerous. They seem to be connective-tissue cells which have absorbed liquids. This assumption is supported by the fact that the connective-tissue cells swell along with the tissues, and may be even seen in all stages of the transformation. They stain a light red with a blue nucleus with the toluidin blue eosin stain. At the margin of the ulcers the protoplasm of these cells often undergoes a sort of parenchymatous degeneration, and at the same time the nucleus swells and becomes indistinct. These cells all stain poorly. Mastzellen are diminished in number in the immediate vicinity of the ulcers. Immediately following the swelling and infiltration of the submucosa the more delicate connective tissues soften and break down, and, usually, in the order named—the veins, arteries, and large bands of fibrous tissue. As soon as changes begin in the submucosa the connective tissues become greatly swollen, quickly lose the power of retaining stains, as when normal, soften, and break down. The large bands, especially, show a tendency to undergo a sort of hyaline transformation at or very near the free surface of the ulcer. I have never found this hyaline change very extensive, nor have I observed it forming a reticulum. Before undergoing the change or breaking down, the large bands of fibrous tissue, like the smaller, become pale and take stains poorly. The elastic tissue does not suffer equally with the collagenous fibres, but remains intact and retains its staining peculiarities long after the surrounding tissues have broken down and disappeared. Perfect bands of this tissue are thus often found lying in masses of granular debris at the very edge of the ulcerated surface. Scattered through the tissues everywhere amœbæ are found, but, as a rule, are most numerous near the points where the most active changes are occurring. Very rarely a single amœba may be found somewhat in advance of the pathological process, but the great mass of these organisms follow, rather than precede, the characteristic changes. They lie almost always in the lymph spaces and in the lymph sinuses, which are numerous in the submucosa. They do, however, occur in the tissues, where a clear zone may almost always be seen around them, which probably results from contraction caused by the fixing agent. No direct local action of the amœbæ can, as a rule, be observed. Amœbæ are also frequently found in the perivascular lymph channels. When amœbæ are present proliferation of the endothelial cells which line the lymph sinuses is often seen. The lymphatics may be considerably, and are often enormously, dilated. Small amounts of fibrin are sometimes found in these sinuses. Masses of fibrin are often found in the tissues just below the ulceration. The walls of the veins are early infiltrated with round cells, quickly followed by softening and complete disorganization. This, no doubt, explains largely the constancy of hemorrhage in this disease. As a rule, the veins contain no more blood than normal. Thrombosis of the veins is not infrequent; but, very strangely,

it seems independent of the presence of amœbæ within the vessels, where they are quite frequently observed. They may occasionally be seen in the act of penetrating the walls of the veins—part of their bodies being within and part without the lumen of these vessels. In like manner the walls of the arteries are infiltrated, and there is evidence of endarteritis, more or less pronounced, as the ulcerative process is slow or rapid. In chronic cases the lumen of the arteries may be entirely occluded by this process. The walls of the vessels sometimes undergo the same hyaline change which occurs in the connective tissue, generally beginning on the side nearest the ulceration. Before the ulceration reaches the muscular layer the nuclei of the fibres swell up, become more oval in shape, and greatly increase in number. After the ulcerative process passes through the submucosa the inner muscular layer, for a time, checks the further progress of the disease. The amœbæ, however, soon force their way into the intermuscular septa, and here cause the same changes which are produced in the connective tissues above. Simultaneously the connective tissue envelope of the muscular layer, which lies next the submucosa, breaks down, and the amœbæ penetrate between the individual fibres. In none of the other tissues are the local effects of the amœbæ more pronounced, and in none can the changes produced be so accurately observed. As with the submucosa, the swelling is pronounced, but with the difference here that the amœbæ precede or keep pace with this condition. The mechanical effect of these organisms on the fibres is always at once obvious. The cement substance softens and gives way, and the amœbæ pass onward between the fibres, pushing them to either side. The fibres swell somewhat, and soon soften, become granular and indistinct, lose their nuclei, and finally entirely break down. The bloodvessels of the muscular layer suffer the same changes which occur in those of the submucosa. As soon as the amœbæ force their way through the circular muscular layer, they pass outward in all directions, and immediately there follow the same swelling, infiltration, and necrosis of the tissues between the two muscular coats, which, under similar circumstances, occur in the submucosa. In the same manner the bloodvessels are destroyed, and, in addition to the already existing disease-producing causes, there follow those changes which result from cutting off the blood-supply. In this way quite extensive sloughs may occur. In the longitudinal muscular coat there is found an exact repetition of the changes which are produced in the circular layer. While the amœbæ are still in the muscular coats, and before any of them pass entirely through, the bloodvessels of the subperitoneal coat become engorged with blood, there are small round cell infiltration, swelling of the tissues, and, in fact, all the phenomena which precede the amœbæ in the submucosa, except that here there is always considerable connective tissue hyperplasia. After the amœbæ reach this coat there may be ob-

served the same necrosis of the tissues and breaking down which occurs in the submucosa. This process may extend outward, and a portion of the peritoneum, becoming necrotic, sloughs out, causing perforation into the peritoneal cavity. More usually, however, the peritoneum thickens more rapidly than the necrotic process advances, which often continues until an enormous thickening of this coat results. Fibrin formation is especially frequent on the peritoneum and in the subserous coat. It is a notable fact that the hyperplastic tissue which is produced in this disease is much more resistant to the disease-producing cause than are the original tissues. The question as to how the amœbæ reach the submucosa is one of great interest. Councilman thinks that they penetrate the mucosa and muscularis mucosæ, and then produce the highly characteristic lesions which always accompany their presence. This certainly seems the only probable hypothesis, if we reject the possibility that the disease may begin as a catarrhal inflammation, and that later the ulcers become secondarily infected with the amœbæ—a supposition that the microscopical anatomy of the ulcers seems at once to refute. On the other hand, it should not be forgotten that the amœbæ penetrate mucous and muscular tissue only with great difficulty, and that they are rarely found in these tissues—especially in the former. In chronic cases, adhesions of the gut to neighboring objects is quite frequent, and, as a result, great distortion sooner or later follows. When these adhesions connect with the small intestine, deformities, almost as great, occur also in this. In some cases the ulcers do not follow throughout a typical course. In Case VI., particularly, were found many ulcers which extended only a short distance below the mucous membrane, and in which there was an absence of most of the phenomena above enumerated. The fibrous tissue of the submucosa in these ulcers was considerably thickened, and bore a striking resemblance to the new-formed fibrous tissue of the peritoneum already referred to. Many amœbæ were found in this tissue, but seemed to exert little, if any unfavorable action upon it. Amœbæ were found in the walls of the ulcers of the ileum and appendix in Case XIV. (Figs. 2 and 3.)

The other form of ulceration, spoken of above, was found only in Case XIV., but seemed quite as frequent as the more typical form in this instance. These ulcers increased in size by gradual softening and breaking down at the surface—never by necrosis and sloughing of the underlying tissues. They sometimes do not extend deeper than half through the mucosa, but generally reach into the submucosa, and rarely extend to the circular muscular layer, but never deeper. They are characterized by the fact that they are more properly a lesion of the mucosa, any deeper ulceration being apparently secondary, and that there is never that swelling and infiltration of the submucosa in advance of the breaking down which characterizes the ulcers already spoken of. Further-

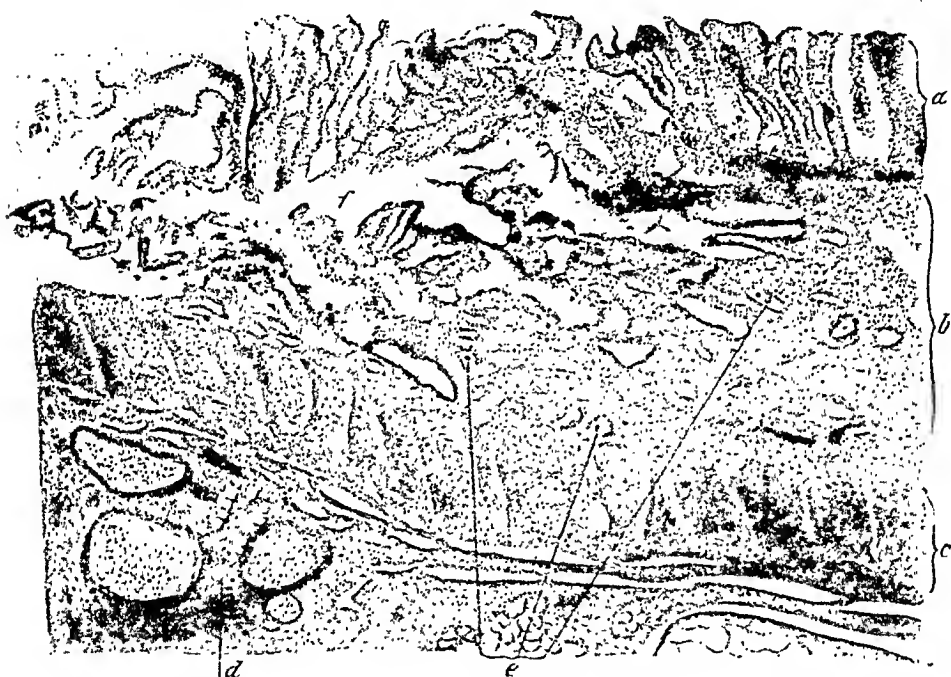
FIG. 3.



Section of Intestine just below ulceration. Toluidin-blue and eosin. Beek $\frac{1}{4}$, Oc. 3. In upper portion of the field a large vein is seen; the wall of the vessel which is nearest the ulceration is being infiltrated with small cells and is breaking down; both red and white cells and amœbæ are seen within the lumen of the vessel. In the lower portion of the field many amœbæ are seen, some in the tissues, and others in the lymph spaces and lymph channel.

more, *they never contain amœbæ*. That abrupt breaking down of the mucosa at the margin of the ulcers which is so common in the other variety is here extremely rare, and never is there that undermining of the mucosa or that luxuriant proliferation of mucous tissue which is almost invariable in the other case. On the other hand, the mucous surface is more or less eroded for some distance from the deepest part of the ulcers, and the glandular epithelium beneath is usually entirely gone or lying in loose masses in the cavities they formerly lined. The blood-vessels are, moreover, more completely distended with blood than is usual in the other variety of ulceration. When the breaking down

FIG. 2.



Edge of intestinal ulcer. Toluidin-blue and eosin. Beck 1 inch, Oc. 3. *a*, mucous coat, which projects over ulcer at *f*; *b*, submucosa; *c*, circular layer of muscle fibres; *d*, tissues of mesocolon; *e*, amœbæ in dilated lymph spaces.

extends into the submucosa there is comparatively little swelling of the tissues, but the small round-cell infiltration is more pronounced than is the case with the ulcers first described. The large, swollen connective-tissue cells, which are so numerous in the other ulcers, are never here observed. The chronic nature of the process in these cases is shown by the fact that there is a decided increase of the fibrous tissue in the neighborhood of the ulcers. The walls of the bloodvessels suffer but little change, and break down only when they are actually reached by the ulceration. The vessels are usually distended with blood. Hyaline changes were never found, either in the tissues or in the walls of the bloodvessels. The lymph vessels are not dilated, nor is there any

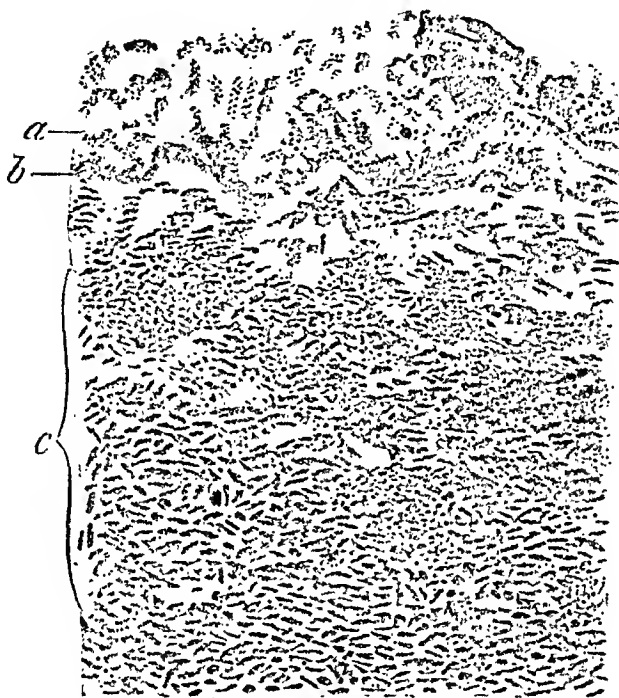
marked change in their walls in advance of the general breaking down of the tissues. After the ulceration reaches the circular muscular coat the number of nuclei in the fibres is sometimes increased, but is never so decided as in the former variety. Under like conditions, the inter-muscular septa may become thickened.

The lymphatic glands of the large intestine in Case XXII. were found somewhat swollen, but were not hard. On section, they presented the usual appearance. Pieces were fixed in corrosive sublimate and Hermann's solutions. Sections were stained by the same methods which were used in staining sections of the intestine. On microscopic examination the lymph sinuses were found considerably dilated, and contained numerous large, swollen cells which almost always contained one, and more frequently numerous vacuoles. These cells usually have only one nucleus, but there are frequent exceptions. Mitosis can sometimes be observed. These cells have occasionally no nuclei, but in these cases the protoplasm takes the stain poorly, and the entire cell is evidently undergoing degeneration. The protoplasm of these cells is acidophilous, and hence shows a red coloration with a dark nucleus when stained by the cosin toluidin blue method. They resemble in every particular the swollen connective-tissue cells which are so numerous in the vicinity of the ulcers, and, like them, greatly resemble amoebæ, especially when stained by some methods. They contain no fat. The lymphocytes of the glands are probably somewhat increased in number. No change of the reticulum or of the bloodvessels is observed. The glands in Case XXXV. were also swollen. They showed a decided increase of lymphocytes and a few of the above-mentioned cells.

In Case XIV. there was an hepatic abscess. The liver was pale in color and was considerably enlarged. It was attached firmly to the diaphragm wherever in contact with it. At one point the ulceration had extended through the capsule of the liver, and almost through the diaphragm. On section, the right lobe was found to be almost completely destroyed, the capsule constituting at many points the only wall of the abscess. One abscess of considerable size and many small ones were found scattered through the left lobe. The inner walls of all of these abscesses are very irregular, and in the larger ones present an extremely ragged appearance. It is a curious fact that these abscesses, as in the present instance, show a much greater tendency to rupture into the lung than into the intestines or peritoneal cavity. The contents of the abscesses were numerous shreds of partially disintegrated tissue, and a creamy, reddish-yellow fluid which much resembled pus. Under the microscope this fluid is found to consist of a mass of granular detritus, a few pus-cells, and numerous amoebæ. Pieces of the liver tissue were hardened and stained by the methods already described. In the edges of sections which had been taken from the walls of the abscesses and in small

abscesses, which could be examined entire, the pus-like fluid which they contained was found to consist largely of a granular mass, in which were a few pus-cells, some nearly destroyed liver-cells, here and there shreds of masses of fibrin, some fibrinous remains of the connective tissue of the liver, which often contained bloodvessels and bile-duets, many amœbæ, and, at some points, multitudes of cocci. This fluid also contained numerous nuclei in a state of partial disintegration, and occasionally small masses of fat. (Fig. 4.) The most interesting of these constitu-

FIG. 4.



Section of edge of a liver abscess. Toluidin-blue and eosin. Beck 1 inch, Oc. 3. *a*, broken-down mass which constitutes the contents of the abscess; *b*, the abscess wall; *c*, the breaking down liver cells in the vicinity.

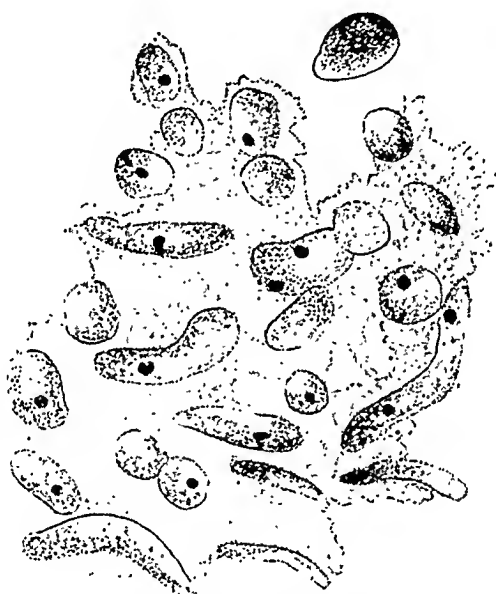
ents are the masses of connective tissues. They often lie at considerable distances from the abscess-wall, and frequently appear to have no connection with it. The degree of vitality which they show under these circumstances is certainly very remarkable. Around their edges the tissues are always softened, their nuclei are swollen, partially broken down, and do not take the stain, and all stages of disintegration may be observed. The central portions of these masses are comparatively little changed, but the tissues are somewhat cloudy and are swollen to a slight extent, and their nuclei are increased in number. Around the margins of these masses is a favorite haunt of the amœbæ.

From the foregoing it will be at once seen that the contents of these abscesses is not pus—indeed, it much more closely resembles the cheesy

masses of tuberculosis. The walls of the abscesses differ somewhat, depending on their size and age. In the small and more recent ones it cannot be said that a wall exists, for the abscess contents gradually, and in a most irregular manner, merge imperceptibly into the surrounding half-degenerate liver-cells. In the larger abscesses the walls—while extremely irregular—are, as a rule, comparatively well defined, and consist of a mass of spindle-shaped or rounder bodies, which are evidently partially broken-down liver-cells. Frequently masses of fibrin constitute a part of the walls, and, interlacing between these cells, form a sort of reticulum. Amœbæ are often found along the inner border of the walls, and sometimes within them, but never penetrate farther than a few micromillimetres from the surface. Numerous colonies of bacilli resembling those found in the intestinal ulcers, and corresponding in their staining properties and their appearance to the colon bacilli, were found along the inner border within and beyond the walls. It would be difficult to conceive of a greater destruction of the liver-cells than occurs in the vicinity of the abscesses, and, indeed, most marked changes of the liver substance can be observed even at points most remote from these lesions. The liver-cells become granular, break up, and are detached from their capillaries. They also become much narrower than normal. Occurring usually in groups, are found very refractive granular cells, which evidently result from necrosis of the liver-cells. These bodies are almost always rounded or oval in shape, contain usually one or more well-defined nuclei, and generally many vacuoles, some of which are composed of fat, as may be seen in tissues fixed in osmic solutions. They are usually from eight to twenty micromillimetres in diameter, and might be easily mistaken for amœbæ. They are stained red with dark nuclei with the toluidin blue eosin method. Closely related to the above are very peculiar long, often irregular, somewhat spindle-shaped bodies, which take the place and result from the necrosis of liver-cells. Indeed, the tissue for some distance around the abscesses is composed almost entirely of these cells. They are highly refractive granular bodies, which contain vacuoles, and sometimes fat, and, occasionally, one is found containing a nucleus. They are from ten to fifty micromillimetres in length, and from three to ten in width. The peculiar variety of degeneration of the liver-cells just spoken of seems almost characteristic of this disease, as I have rarely seen it around abscesses which contained no amœbæ, and, at the most, I have seen only a few broken-down cells which somewhat resemble those found in the walls of amœbic abscesses. (Fig. 5.) Owing to the narrowing of the liver-cells the spaces between them are much increased in size, and within these spaces the capillaries are usually found detached from these cells. It often occurs that only traces of the capillary walls remain. Blood is conspicuously absent in the capillaries in the immediate vicinity of the abscesses, but,

in its stead, these vessels are often partially filled with the same kind of granular detritus that surrounds them. Occasionally, in the neighborhood of the abscesses, small areas are found in which the liver-tissue is almost entirely replaced by blood. This is evidently the result of hemorrhage from some of the larger vessels. The walls of the intralobular veins and those of such other vessels as are not surrounded by masses of fibrous tissue become infiltrated with cells as the necrotic process advances toward them, and later swell, soften, and break down. Not infrequently the bloodvessels were surrounded by a slight, small round-cell infiltration, but there is a remarkable absence of anything like a general inflamma-

FIG. 5.



Degenerating liver-cells and an amoeba. Toluidin blue and eosin. Beek $\frac{1}{4}$, Oc. 3. Showing the various forms assumed by the degenerating liver-cells, and for the purpose of comparison an amoeba is represented in the lowest figure. The liver-cells are stained red with blue nuclei, while the amoeba is of an almost uniform dark-blue color.

tory reaction on the part of the tissues. In the tissues surrounding the abscesses, but never extending very deeply, numerous clumps of bacilli are seen, resembling in every way those found in the abscess-walls. The liver-cells, or the remnants of the same, which are in immediate contact with these bacilli are more completely broken down than the other cells in the vicinity, but this never extends to any distance.

It will be seen from the above, as pointed out by Councilman, that the soluble products of the amoebæ probably produce the extensive necrosis of the liver-tissue observed in the vicinity of the abscesses, but that complete breaking down and softening do not occur until the amoebæ come actually in contact with it.

The question as to how the amoebæ reach the liver has not as yet been

decided. Some have thought that they penetrated through the walls of the intestine, passed along the peritoneum, and burrowed their way through the capsule of the liver. This explanation seems to me extremely improbable. I think it all but certain that the amœbæ reached the liver by means of the portal circulation, as has been without doubt the case in instances recorded where there was a condition of almost miliary abscess of the liver. This view is also strengthened by the fact that the amœbæ are so frequently seen in the bloodvessels of the intestines.

Specimens of the kidneys were only examined in Cases XIV., XXII., and XXXV. In Cases XXII. and XXXV. the changes were limited to a slight granular degeneration of the lining-cells of the larger tubules, and there were very generally found collections of granular material, which stained faintly, in the spaces between the glomeruli and the capsule of Bowman. In Case XIV. the vessels were universally distended with blood. The cells of the tubules were intensely granular, their nuclei stained poorly or not at all, and they were frequently separated from their basement membrane and collected in masses in the centres of the lumina of the tubules. There was around the glomeruli none of the granular material described in connection with Cases XXII. and XXXV., but the nuclei of these bodies were considerably increased in number. There were no changes in the connective tissues of the kidneys, not even in the situations nearest to the liver-abscess.

There were no noticeable changes in the spleen.

After fixing specimens of the heart-muscle in Flemming's solution, many sections were made from Cases XIV. and XXII., for the purpose of determining as to whether fatty degeneration existed, but in neither was this found.

The lungs were normal in three of the four cases where autopsies were made. There were miliary tubercles in Case VI.

SYMPTOMS. The disease usually begins acutely, with slight fever, griping, tenesmus, and frequent stools. Occasionally, however, the onset is gradual, there being a period varying from a few days to several weeks, during which the stools, at first only somewhat watery and frequent, become gradually more dysenteric in character, and finally the symptoms in the two varieties merge insensibly into each other. If the acute form becomes severe, we find, with the exception that here the inflammatory phenomena are generally more marked, the same symptoms that occur in the severe chronic form. The disease, however, as we commonly meet with it, is pre-eminently a chronic one, and lasts all the way from a few weeks to many years. In this variety the general condition is often remarkably good, but in the severer forms great emaciation is frequently observed. Loss of appetite is common, but nausea and vomiting rarely occur. Fever and rapid pulse are decided only in the severer forms of

the affection. The patients complain of a sense of uneasiness in the abdominal region, with a more or less constant desire to go to stool, as the disease is of a severe or mild type. After the affection becomes chronic, tenesmus is, as a rule, slight; but during exacerbations it is often quite severe. For the purpose of convenience we may—somewhat arbitrarily, it must be confessed—divide, clinically, the chronic form of the disease into several types.

1. *The very mild form.* The appetite and general health are good; no fever or acceleration of the pulse worth mentioning. The number of stools varies from two to five or six in twenty-four hours. This is the usual form in children.

2. *The moderately severe form.* The general nutrition is here decidedly interfered with, and there is frequently more or less anorexia. The pulse is somewhat increased in frequency, and there are irregular exacerbations of temperature, occurring especially at night. The stools vary in number from six or eight to fifteen or twenty in twenty-four hours.

3. *The very severe form.* This differs but little from the severest of the acute type. There are great emaciation, loss of appetite, and sometimes nausea and vomiting. Profuse sweating may occur. Hiccough is frequent. The extremities are often cold, and the pulse is rapid and weak. The temperature varies much, but is usually somewhat above normal; as death draws near it sometimes becomes subnormal. The stools are watery, filled with blood, mucus, and sometimes sloughs, and vary from twenty to fifty in twenty-four hours. It is really wonderful how long patients will remain in this condition without dying, and in no disease may death be more closely approached and recovery follow.

There are remarkable fluctuations in the severity of the symptoms in all of the chronic forms, and especially does this apply to the number of stools. In the milder types there are often not more than three or four actions in twenty-four hours, but at any time the number may be increased to ten or fifteen, or even more. On the other hand, in the severest forms the number of stools may without any apparent cause suddenly decrease in number, which may continue until complete recovery results. It thus happens that we often see the mildest forms of this affection suddenly changing to the worst, and *vice versa*. It is a fact that some cases are greatly aggravated by the taking of alcoholics—beer seeming to be especially injurious. Any form of bodily exertion is generally followed by an exacerbation of the symptoms. A constant aching pain in the back, not relieved by the recumbent posture, is a symptom which has been prominent in several of my cases, and has caused a great deal of trouble. Pain, of a tearing character, in the region of the colon, is also an occasional symptom. Oedema of the feet and face is occasionally seen.

In the milder forms the urine is, as a rule, normal, but albumin was

noted in some of the severer cases, especially if the temperature was high. In some of my worst cases I have day after day carefully examined the urine for peptones, by Hofmeister's method, but never found them present. Chlorides may be much diminished or suppressed. Their reappearance or increase is a most favorable symptom.

The feces in the milder forms may appear almost normal in both color and consistency; but, on careful inspection, small particles of bloody mucus will be found lying here and there on their surfaces. In the most severe forms the stools are loose, and contain considerable quantities of mucus and blood, mixed with partially digested food, are very offensive, and, while the color varies considerably, a more or less reddish tinge is quite constant. The discharges in the worst forms of this affection are, I think, entirely characteristic. They consist of a soft, jelly-like mass which has an almost evenly distributed pink hue. Sometimes the amount of mucus is not so great, and, especially shortly preceding death, they may lose almost entirely their mucous character and become scarcely more than bloody water. They are almost always of an alkaline reaction. In two cases I have found the reaction slightly acid. On microscopical examination, the feces are found to consist of fragments of partially digested food, much mucus and blood, pus, large epithelioid cells, multitudes of bacteria, and varying numbers of amœbæ. *Cercomonas* are not infrequently found.

The most important complication of amœbic dysentery is hepatic abscess. Out of seventy-eight cases it occurred fifteen times, one of which was in a boy. This complication occurs only in the early stages, or, at the most, it is certainly very rare in the chronic cases. It would seem that it is more common in some localities than in others, for in my thirty-five cases it has occurred only twice. This is, I am sure, in a measure explained by the fact that the majority of my cases were seen only after the disease had become chronic. The usual symptoms are chills, fevers of an irregular character, acceleration of the pulse, and a throbbing or aching pain in the region of the liver, or the pain may be reflected to the right shoulder. At the same time the tongue becomes coated, the appetite fails, and the patient rapidly loses flesh. On physical examination, there is found enlargement of the liver, and occasionally a fulness or marked protrusion develops at the lower border of the ribs. Jaundice is rare. Sometimes the usual symptoms are absent, and, with the exception of a general cachexia, no symptoms exist.

If the liver-abscess opens into the lung, as it very frequently does, abscess of this organ develops. The symptoms are cough and the expectoration of reddish-brown fluid, which, on microscopic examination, is found to contain amœbæ. The usual signs of consolidation develop in the lung. This complication I have not seen; it has occurred only three times in seventy-eight cases.

When perforation of the intestine occurs and peritonitis follows, the symptoms which are usually produced under these circumstances follow. I do not think, however, that the inflammatory phenomena are ever so marked as in the septic peritonitis which follows operations.

Appendicitis would, of course, occasion the usual symptoms. However, in my case, which is, so far as I know, the only recorded one of the kind, the symptoms were of such a mild character that the condition was not suspected before death.

DIAGNOSIS. The diagnosis cannot be made with certainty except by finding the amœbæ. When we find, however, the patient suffering with a chronic dysentery that shows great variations in intensity, and which, moreover, resists all the usual remedies employed in the treatment of this affection, the probability becomes very strong that it is a case of amœbic dysentery, and should always lead to an immediate examination of the stools. Whether the amœbæ be the cause of this disease or not, I do not believe that it is possible to overestimate their value as a means of differentiating between this affection and conditions such as carcinoma and tuberculosis, for which it might be mistaken.

PROGNOSIS. This is a very fatal disease. Out of the seventy-eight cases reported in this country there have been thirty deaths. It usually occurs in a milder form in people of the colored race than in those of the white. It seems very certain that the disease is rarely so severe in children as in adults. After it becomes chronic, and in the vast proportion of cases it does become so, the chances of recovery, even with the best treatment, are always bad. However, at any time the disease may rapidly grow better, and the patient recover, or, on the other hand, it may become worse, and death result. After apparent recovery relapses frequently occur, and a patient should never be considered out of danger until many months after all traces of the disease have vanished. Spontaneous recovery sometimes occurs.

Liver-abscess is a very fatal complication, twelve out of the fifteen cases reported in this country having proved fatal.

Abscess of the lung is very grave, but it probably adds little to the existing danger, as an opening is thus made for the pus pent up in the liver-abscess.

Perforation of the intestine and peritonitis are probably always fatal. As mine is the only recorded case of amœbic appendicitis, and as this case was complicated by a liver-abscess, nothing can as yet be said respecting the prognosis, but it is doubtless very bad.

TREATMENT. As I have never happened to see a case of this variety of dysentery at the very beginning, I can say nothing from personal experience as to the treatment. It would, perhaps, be best to employ the remedies which are usually used in the common catarrhal forms of this affection. Ipecac especially deserves a thorough trial, as it is

the drug that has proved of the most benefit in the dysenteries of India, which are probably often amœbic in character. In the chronic form I have from time to time used almost everything which has ever been recommended in the treatment of this class of diseases, but have rarely seen any striking effect produced by them. In its behavior toward drugs this variety of dysentery is almost as capricious and variable as are its symptoms. Opium checks the number of discharges, but I have never seen any permanent good result from it. Sulphuric acid has in several cases apparently produced some benefit, but never a cure. One patient recovered while taking salol. The treatment heretofore most recommended has been rectal injections of 1:5000 aqueous solutions of quinine sulphate. I used this treatment with great persistence in some of my earlier cases, but not in a single instance was there the slightest perceptible result. Injections of 100:300 watery solution of bisulphate of quinine were somewhat beneficial in one or two instances. One patient recovered while using injections of potassium permanganate, but in several other cases no effect was observed. In not a single instance did improvement follow injections of ice-water. Several years ago, while speaking on this subject with my friend, Dr. I. B. Diamond, at that time a student, he suggested that, on account of its antiseptic effect, possibly hydrogen dioxide might be of service. With but little hope, I must confess, I tried it on Case V., with the result that the patient rapidly improved. As soon as she was strong enough to go to work she did so, and at the same time abandoned the treatment and resumed a solid diet. In a short time she relapsed, and was again treated in the same manner with a like result. She again stopped the treatment, and, although I have not since seen her, I learn that she again has the trouble. Since that time I have treated many of my patients with this agent, with the result that some have been cured, and, with but one or two exceptions, the improvement after its use has been striking and immediate. All hemorrhage at once ceases, the stools rapidly decrease in number, and the general condition grows better. The effect of this drug, however, is by no means constant—it benefiting some patients much more than others. Even in the same patient this sometimes holds good, for, in one or two instances, in relapses, after it had apparently effected a cure, its use a second time was wholly without benefit. The ordinary commercial hydrogen dioxide is diluted from four to eight times with water, and the solution injected. About a quart is injected twice daily, which, after a week, may be gradually decreased. This is the only agent which has in my hands proved of any decided value. I do not doubt that it would prove of equal value in all varieties of dysentery, especially in the chronic forms.

Hydrogen dioxide, as found in the market, is notoriously uncertain in strength, some samples being utterly valueless. If improperly prepared

it decomposes rapidly. This may, in a measure, explain the lack of uniformity in the results obtained by its use.

The diet should be liquid, whether the affection is acute or chronic. I have used milk almost entirely, and, as a change, occasionally egg-albumin.

The remarkable toxic effect of the toluidin blue on the amœbæ would suggest the employment of rectal injections of this substance in the treatment of the disease; but in the absence of any knowledge as to its action on the human being, I have not made the attempt.

My friend, Dr. E. A. Corson, of Savannah, Ga., some years ago suggested to me that in suitable cases the establishment of an artificial anus at the ileo-cæcal valve, and the subsequent washing out of the colon with hydrogen dioxide, might be employed with advantage.

In finally dismissing the subject I cannot forbear stating my conviction that imperfect hygienic conditions are indirectly responsible for the prevalence of amœbic dysentery, and that with even an ordinary attention to sanitary laws the disease would in a short time cease to exist.

I wish, in conclusion, to express my thanks to my friends, Mr. J. C. Haskell, Jr., for the drawings of the fixed amœbæ, and to Dr. I. B. Diamond for much valuable assistance.

TWO CASES OF CONGENITAL SYPHILITIC CIRRHOSIS OF THE LIVER IN INFANTS.

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THE following two cases, which came under my care within a short interval of each other, afford excellent examples of the changes in the liver in hereditary syphilis, in the one case more advanced than in the other, and leading to great destruction of the parenchyma of the organ:

The first patient was an infant of ten weeks; she was brought to the Bristol General Hospital with a history that she had appeared to be in pain in the stomach, that the belly had always been rather large, but that no distinct swelling had been observed until ten days previously, when a swelling in the upper part of the abdomen had appeared and had gradually increased.

During the same time the child had vomited all the milk she had taken. There had been no jaundice at any time, and no hemorrhage from the stomach or bowels; the child was fed at the breast; the bowels had been moved regularly, and the motions were normal. The urine was of normal appearance.

Both father and mother were healthy, according to the mother's statement, and had one other child, also healthy. The patient had suffered

from snuffles, but had had no eruption on the skin. The mother has since the patient's death given birth to an infant presenting the typical signs of hereditary syphilis. On examination the infant was very small, much emaciated, and appeared extremely weak and ill. The pulse was rapid, almost imperceptible, the fontanelle depressed. She was very anæmic, but not jaundiced. The temperature and respiration were normal, and the tongue clean. The abdomen in the epigastric and hypochondriac regions was the seat of a large swelling. Over this there was dulness and a large, hard, and resistant tumor was felt which moved freely with respiration, and appeared to be the liver; the lower edge of the tumor was sharp and smooth, and came about two inches below the umbilicus. The infant died on the following day.

At the post-mortem the body was extremely emaciated, there being no subcutaneous fat. The bases of the lung were congested, but otherwise the heart and lungs were normal. The abdominal cavity contained about three-quarters of a pint of serous fluid. The liver was very large and filled nearly the whole abdomen, extending from two to three inches below the umbilicus. It was finely granular on the surface, and of a pale yellow color.

On section it was smooth, pale yellow in color, but not bile-stained; of about the normal consistence and of a homogeneous appearance, the outlines of the lobules being indistinguishable. Scattered over the surface of the section were small, pale, rounded areas (miliary gummata).

The gall-bladder was empty and of healthy appearance; there was no obstruction of the bile-ducts.

The spleen was large, dark, and firm, and would weigh about three ounces.

The kidneys were pale; the capsules stripped well, leaving a smooth surface; on section, both cortex and medulla were very pale, but otherwise appeared healthy.

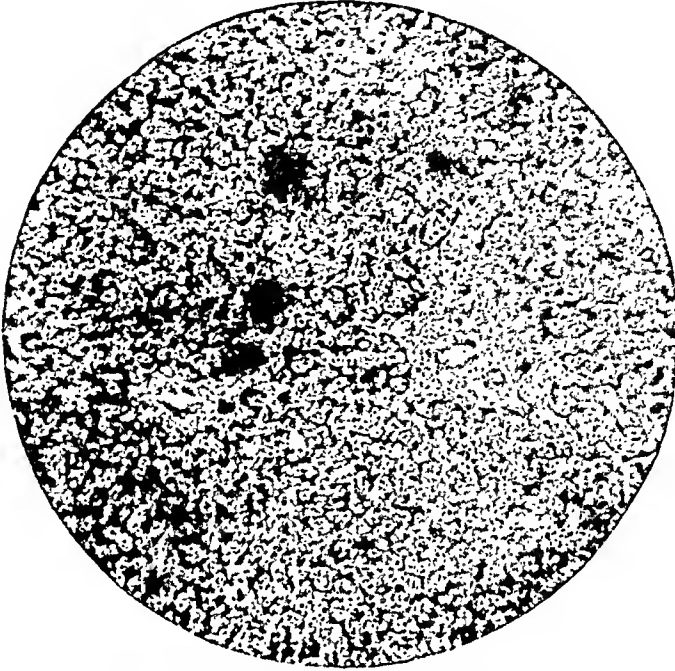
The intestines and stomach were contracted and empty, but otherwise normal.

Owing to the post-mortem being made at the patient's house, the weights of the organs were not obtained.

Microscopically, the small, pale areas in the liver are seen to consist of small collections of round cells (miliary gummata), seated, as a rule, in the periphery of the lobules. In some places the connective tissue in the sheath of the portal canals is much increased, so as to form a small mass of fibrous tissue. There is slight general increase of connective tissue in the portal canals around the vessels, and in many instances the newly-formed tissue is abundant around the central vein of the lobule. Both the vessels in the portal canals, the bile-ducts, and the branches of the hepatic veins appear healthy. With regard to the lobules the liver-cells show more or less imperfectly the arrangement into columns, but are flattened from the pressure of a new growth of richly nucleated, faintly fibrillated connective tissue along the walls of the capillary vessels, and often form Y-shaped figures, staining deeply; they are sharply demarcated from the surrounding newly-formed connective tissue, and their nuclei are oval or rounded and in great abundance. This growth pervades the lobules of all parts of the liver, but varies in amount in different parts. Where it is most abundant the liver-cells have almost disappeared, leaving conspicuous large round or oval nuclei, the product of cell proliferation, which is everywhere active, or the

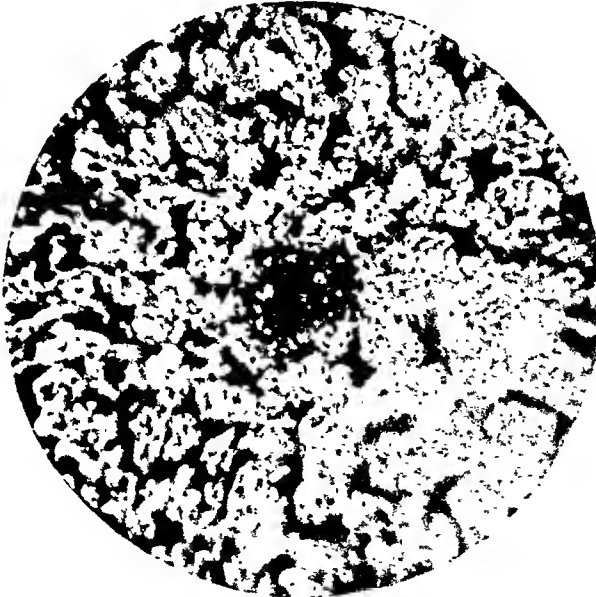
cells are small, angular in shape, and atrophic. The protoplasm of the cells is finely granular, and more or less disintegrated, the outlines of

FIG. 1.



Under a low power. To show the miliary gummata, general appearance of sections and newly formed tissue within the lobules and in the portal canals, this figure should be viewed through a magnifying glass.

FIG. 2.



The same under a high power. There is a small gumma in the centre of the field, and the abundant formation of richly nucleated connective tissue between the hepatic cells, which are more or less atrophied, is shown. The sections were stained with carmine and methyl-aniline violet.

individual cells being unrecognizable. I could not trace the formation of connective tissue from liver-cells. (See Figs. 1 and 2.)

The process is thus one of an active new formation of a richly nucleated connective tissue along the intralobular capillaries, due to proliferation of the connective-tissue cells between the capillaries and the liver-cells and of the capillary endothelium, with consequent degeneration and atrophy of the proper cells of the organ.

The other patient was a male infant of one month. He had been extremely delicate from birth, and was taken ill one day before admission, with vomiting and cough. He had not had snuffles nor any skin eruption.

Soon after her marriage the mother had a sore-throat and a measly rash over the trunk and limbs, and since then had suffered much from headache and aching pains in the limbs. The child was very ill on admission, with a temperature of 101° F., rapid respiration, depressed fontanelle, and anæmic appearance. There was no jaundice.

At the base of the left lung there were dulness and bronchial breathing, and moist râles were audible all over the chest. The upper region of the abdomen was prominent, and the liver was felt to be enlarged. He died the day after admission. At the post-mortem the body was much emaciated and weighed eight pounds twelve ounces.

There were no scars or eruption on the skin.

The lungs showed scattered patches of broncho-pneumonia, with general bronchitis. The heart was healthy; it weighed two ounces. The abdomen was large; there was no ascites, and the peritoneum was normal. The stomach and intestines were pale, but healthy. The liver weighed seventeen and a half ounces. It was smooth and pale yellow in color, and its edge sharp. On section it was smooth, pale yellow, but in parts a yellowish white; it was very tough, not breaking down under the finger. In the central parts were small tracts in which the proper substance of the liver was replaced by smooth fibrous tissue in small bands and masses. Around these areas of fibrous tissue the lobules were recognizable, and the substance of the liver was softer and yellowish in color. The gall-bladder was empty, the bile-ducts normal.

The spleen, weighing two ounces, was smooth, somewhat soft, dark red on section, mottled over with small areas of extravasation. The suprarenal capsules were healthy.

The kidneys were pale; on section the boundary zone was injected, and the cortex and pyramids were pale—otherwise they were normal. The brain was normal, but very pale.

On microscopical examination the proper structure of the liver was much altered, but not uniformly so, by a diffused change, consisting of a formation along the capillary vessels of a lowly organized, nucleated connective tissue, spreading through the lobules from periphery to centre, with nuclear proliferation of the cells along the capillary walls, but without marked round-celled infiltration. The liver-cells were throughout the organ greatly degenerated, and atrophied from pressure. Their nuclei were proliferating, and the cell substance was filled with fine granules; in a few places they had undergone fatty degeneration, but this was not a marked or general change. These appearances were less marked in some parts than in others; in some the liver being hardly

recognizable, in others being present but highly granular. The arteries showed endarteritis obliterans, and the epithelial cells in the bile-ducts were also proliferated. The veins were normal.

Along the portal canals and between the lobules, also in some parts of the liver around the central vein of the lobule, there was an increased amount of connective tissue, staining badly and of a pale, translucent, homogeneous appearance. This was apparently newly and imperfectly formed connective tissue. In a few places there were very small collections of round cells (interlobular), but these were few and inconspicuous.

In the kidneys the cortical epithelium was granular, and the small and medium-sized arteries showed endarteritis obliterans. This did not affect the arterioles or the afferent vessels of the Malpighian capsules.

This case, then, showed the same changes as the first, but in a more advanced stage, with much more extensive destruction of the liver-cells; differences were found in the absence of miliary gummata, unless the few small collections of round cells mentioned above may be taken as remnants of them, and in the presence of endarteritis obliterans. This latter process might be answerable in part for the greater destruction of the hepatic cells, although the chief factor must be held, as in the first case, to be the pressure exercised upon them by the newly-formed tissue along the intralobular capillaries.

Thus the process is one of a subacute interstitial hepatitis resulting in the progressive destruction of the proper cells of the organ. If the term cirrhosis be applied to the condition it should be described as an intercellular or intralobular cirrhosis. It differs from the acute form of biliary cirrhosis occasionally met with in infants,¹ in that the process in the latter is a much more acute one, starts from the small bile-ducts, and is attended with jaundice. Clinically, the points in the above cases were the history of syphilis, the absence of jaundice, the large size of the liver, the extreme degree of emaciation, and the vomiting of all food. In the second case death was due to the pulmonary complication, but in the first there was no complication, and the early age at which death occurred and the acute character of the symptoms of the terminating illness are noteworthy.

For the photographs I am indebted to the kindness of Mr. James Taylor.

¹ See a paper by Gibbons, of Calcutta: "Scientific Memoirs by Medical Officers of the Army of India," 1891, vi., and by author, Brit. Med. Journ., June 30, 1894.

GLAUCOMA AND THE INFLUENCE OF MYDRIATICS AND MYOTICS UPON THE GLAUCOMATOUS EYE.

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MYDRIATICS IN GLAUCOMA.

It is well known that the application to the eye of one of the mydriatics has sometimes been followed by an outbreak of glaucoma. The following case is the only one of the kind which I have seen among several thousand patients whose eyes were subjected to the use of different mydriatics for the determination of errors of refraction.

CASE I.—A dark mulatto woman, aged twenty-five years, applied at the Philadelphia Polyclinic at the end of the clinic hour, giving this history: Two years before the left eye became red and painful. Since then she had pain in it at intervals, and blurred vision. The eye weeps continually. She was illiterate, and her vision was not obtained at the first visit, nor was any record made of an ophthalmoscopic examination.

A solution of duboisine sulphate (1 to 240) was ordered to be instilled in both eyes to prepare for measurement of her refraction.

Next day four instillations had been made. Her pupils were well dilated, and accommodation paralyzed, but there was marked arterial pulsation in each eye. In the right eye there was a wide physiological cup with sloping sides. In the left eye the cup was as wide as the disk, with abrupt edges, and about 2.5 dioptres deep. The central artery bifurcated in sight; and the principal branches showed an arterial pulsation extending beyond the disk margin. Tension + T. doubtful in each eye. She had no pain since using the mydriatic. There was no hyperemia of the globe.

There was no failure of the arterial pulse on raising the arm. She had muscular rheumatism two years previously, but not affecting the joints, and was not seen for it by a physician. She was carefully examined in Dr. Cohen's clinic, but no evidence of cardiac or vascular disease was detected. Vision was: Right, + 1.5 sph. = $\frac{1}{2}\frac{5}{6}$ mostly; left, with + 1.25 sph. = $\frac{1}{2}\frac{5}{6}$.

The use of the duboisine was immediately stopped, but two days later the eyes began to give pain; and when she came on the fourth day there was haziness of the dioptric media, and a red pericorneal zone, the left eye being the worse.

Sixth day. Right eye free from pain; media clear; but the arterial pulsation still marked. The left eye showed a marked pericorneal zone; fundus dimly seen; tension of each eye was now + 1. She was put under the use of eserine solution (1 to 240), instilled three times a day.

Eighth day. The pupils are still fully dilated. The right eye still shows slight arterial pulse. The left eye is free from pain, with slight pericorneal zone, the media clearer, uncertain pulsation. Tension: Right, + T.; doubtful. Left, + T.; doubtful.

Tenth day they continued the same.

Eleventh day. Left pupil beginning to contract; pulsation now clearly seen in that eye.

Twenty-first day. Right eye, tension +; media hazy; marked arterial pulsation; pupil 6.5 mm. in diameter. The left eye is as before, with pupil 4.5 mm. in diameter. She is still using eserine.

One month after use of the duboisine vision in the right eye = $\frac{1.5}{30}$, and in the left eye = $\frac{1.5}{100}$.

She persistently refused to allow an iridectomy, and several months afterward had become practically blind in the left eye, with the right growing worse with repeated glaucomatous attacks.

The first thing to be noted with regard to this case is that careful ophthalmoscopic examination, with less reliance on the age of the patient and her race, might have led to the recognition of the glaucoma at the first visit. Glaucoma at so early an age is very rare. I have seen no other case in my own practice, and can recall but one seen in the service of a colleague. Priestley Smith¹ found among 1000 cases of primary glaucoma but five patients under twenty years of age, and but twenty-three between twenty and thirty, and it is probable that of cases occurring at such an early age a much larger proportion are reported than of those occurring at the usual time after middle life.

Again, glaucoma is rare among colored people at any age, so that it was natural not to have thought of glaucoma in connection with the case. It is probable, too, that a hasty ophthalmoscopic examination was made, and nothing abnormal detected. Yet it is almost certain that the cupping of the left disk, recognized the next day, might have been made out by careful study through the undilated pupil; and the history, although fitting well with the supposition of eye-strain, when read by the light of subsequent events, pretty clearly indicates that the left eye had for two years been the seat of occasional mild glaucomatous attacks.

The case is of especial interest, because seen from the very beginning of the attack. On the first day after the use of the mydriatic the increase of tension was doubtful, and there was no positive sign of glaucoma, except the pulsation of the retinal arteries, and the cupping of the disk in the left eye. Not until two days later was there any pain, redness, or marked increase in the intraocular tension.

The length of this interval between the use of the mydriatic and the occurrence of marked symptoms of glaucoma was exceptional, the attack so produced usually becoming severe within a few hours. Still this delay has been noted in other cases. F. T. Rogers² reports a case of acute glaucoma in both eyes following the instillation of homatropine, in which it was not until the fourth day (when the influence of the homatropine has usually entirely passed off) that marked increase of the tension was

¹ Trans. Ophthal. Soc. of United Kingdom, vol. vi. p. 234.

² Ophthalmic Record, v. p. 421.

found. In a case reported by S. Snell,¹ the eyes were examined the day after that on which atropine had been used, and were found "perfectly normal." But three days afterward the sight was affected, and a sharp attack of glaucoma occurred.

The case also seems to illustrate the value of arterial pulsation as the earliest and most delicate test of increased tension in the eyeball, at least in some cases. When pulsation was discovered the absence of decided increase of intraocular tension or other characteristic symptoms of glaucoma gave the impression that the pulsation was due to diminished blood-pressure in the arteries. A careful search was made for evidence of probable causes of diminished arterial tension, and only when these were proved to be entirely absent was it thought probable that the pulsation was due to increased tension in the eyeball.

G. C. Harlan has reported a case² in which transient pulsation of the retinal arteries was induced by the application of homatropine, but in which no other symptom of glaucoma developed. The patient, a man, aged sixty-six years, with tension regarded as normal or of doubtful increase, showed after the application of homatropine a vigorous pulsation in the retinal arteries of one eye, which pulsation ceased when the pupil was contracted again with eserine.

After this observation had been made there was noticed some enlargement of the anterior ciliary vessels, but no other symptom of glaucoma. The instillation of homatropine was repeated three times, each time producing decided pulsation, which promptly disappeared when the pupil was contracted with eserine.

It must not be supposed that all cases of glaucoma are certain to be injuriously affected by mydriatics. The writer has seen several cases in which mydriatics have been used without causing increased pain. In one case, seen in 1883, which had probably been treated for several weeks with atropine, the patient after iridectomy regained vision, which at the end of four years equalled fifteen-fifteenths partly, although the field was greatly restricted. In this case, at the end of nine years vision began to fail, and, in spite of the use of eserine, was reduced to mere light perception, when she was last seen in 1894.

O. F. Wadsworth³ reports a case of hemorrhagic glaucoma in which the pain diminished for a few days under the use of atropine, but subsequently returned, and the eye was enucleated. He also reports the following:

"A woman came to the hospital complaining of pain in and about one eye. There was circumcorneal congestion and one or two narrow posterior synechiae. Atropine was applied. Half an hour later the

¹ Trans. Ophthal. Soc. of United Kingdom, vol. II, p. 100.

² Transactions of the American Ophthalmological Society, 1890, p. 633.

³ *Ibid.*, 1890, p. 150.

pain was relieved, and an ophthalmoscopic examination revealed strong arterial and venous pulsation and a large central excavation. Tension was increased. On inquiry into the history it was learned there had been short glaucomatous attacks during the past five months, of late at intervals of less than two weeks. In accordance with the prevailing opinion, the patient was warned against the use of atropine; but on a subsequent attack, ten days later, she did use atropine herself, and again with relief of pain. An iridectomy stopped the attacks."

G. C. Harlan has known duboisine, used by mistake for eserine, to give relief, and W. F. Norris says it is well known that atropine does not always increase tension.¹

The reason for such an apparently contradictory effect produced by mydriatics in glaucomatous eyes is probably that pointed out by Priestley Smith,² "That whenever a mydriatic raises or lowers the tension of the eye in any very marked degree it does so by altering the position of the iris in such a manner as to hinder or to promote the escape of the intraocular fluid."

One effect of dilatation of the pupil is some thickening of the iris opposite the filtration angle of the anterior chamber, and when this angle is already narrowed or partly obstructed, such thickening increases the obstruction. But while mydriatics show a liability to increase the obstruction of the filtration angle, and thus to raise the tension of eyes already glaucomatous or upon the verge of glaucoma, they probably have no more general tendency to cause glaucoma. And they may, by reducing intraocular congestion or in other ways, exert a beneficial influence upon glaucomatous eyes that they cannot injure by dilating the pupil.

The liability to do harm in glaucoma appears to be shared by all the mydriatics. As each new drug of this class has been introduced the hope has been expressed, and sometimes apparently sustained by the history of the earlier trials, that it would not have this influence in glaucoma. But subsequently cases of this kind of harm from its use have been reported.

In practice, however, the two mydriatics, homatropine and cocaine, may be regarded as free from serious danger of causing permanent injury to the patient, since their effect upon the iris can be promptly overcome by eserine. Thus, in Dr. Harlan's case, referred to above, the arterial pulsation was entirely under control through eserine, and during the last few years the use of cocaine (with one of the myotics to prevent any dilatation of the pupil by it) has grown rapidly in favor as a means of treating glaucoma where, for any reason, iridectomy cannot be at once resorted to.

¹ Ophthal. Record, 1897, p. 319.

² Ophthalmic Review, 1882, p. 72.

As I have found, experimentally, in a limited number of eyes,¹ eserine is capable of neutralizing the effects of six times its weight of homatropine upon the iris and ciliary muscle, so that by repeated instillations of a strong solution of eserine (1 to 240) it is possible to contract the pupil within a few hours after it has been fully under the influence of homatropine. This is in strong contrast to the influence of atropine, which overcomes five, or duboisine, which overcomes twelve, times its weight of eserine.

The application of the eserine, however, should be made as soon as the glaucoma is discovered. The action of homatropine is commonly limited to two days in normal eyes, but may be prolonged to five days (see the case reported by de Schweinitz);² and is specially liable to be prolonged in glaucomatous eyes, as in the case reported by Rogers. Then, too, the increase of tension interferes with the absorption of the drug, and the longer the pupil is allowed to remain dilated the more the intraocular pressure is likely to rise.

With cocaine the case is somewhat different. In the first place, it requires but one-twenty-fifth its weight of eserine to neutralize its action on the pupil. Even one-fourth of its weight of pilocarpine is sufficient to do the same thing. And aside from its action upon the iris, dilating the pupil, the tendency of cocaine is to diminish the intraocular pressure by causing constriction of the bloodvessels. In a combination preventing its dilator effect on the pupil it is a perfectly safe drug to apply to the glaucomatous eye.

THE INFLUENCE OF MYOTICS IN GLAUCOMA.

In 1876 Laquer published his observations on the curative power of eserine in glaucoma.³ In the same journal for August 12th, of that year, a communication from Dr. Lucius claimed that A. Weber had employed eserine for this purpose in 1873 and 1874, and that the case treated with it in the latter year had remained permanently cured. However, Weber's paper,⁴ published next year, cautions against certain dangers from eserine, and urges pilocarpine as a better and safer remedy for glaucoma.

Since that time these myotics, especially eserine, have been widely tried, and their influence in contracting the pupil and diminishing the intraocular tension in glaucoma has been generally recognized. But it has also been recognized that the cases they will permanently cure are very few, and that there is danger in the reliance that may readily be

¹ Chairman's Address before the Section on Ophthalmology of the American Medical Association. See Transactions of the Section, 1893, p. 21.

² Ophthalmic Review, 1892, p. 1.

³ Centralblatt für med. Wissensch., June 10, 1876.

⁴ Graefe's Archiv, 1877, xxiii. p. 1.

placed upon them on account of the marked benefit they afford in the earlier stages of the disease. This danger is illustrated by the following case, reported in this JOURNAL for April, 1882, by the late A. G. Heyl, who saw it in consultation with F. P. Henry, who years later referred the same patient to me.

CASE II.—Mrs. M., aged fifty-five years, had duboisine sulphate instilled into her left eye by Dr. Henry, to facilitate the ophthalmoscopic examination, the vision in that eye being 10/L, and the tension of the eyeball normal. With the ophthalmoscope a suspicious cupping of the disk was discovered. Within twenty-four hours acute inflammatory glaucoma developed, the eye became injected, the cornea and vitreous hazy, so that no view of the fundus could be obtained, and the tension considerably increased. Within forty-eight hours after the use of the duboisine Dr. Henry made a large upward iridectomy, and the glaucoma was perfectly cured. The other eye appeared normal, with a physiological cupping of the disk; but about two weeks later it became hard, with diminished vision. Under the use of eserine and morphine these glaucomatous symptoms promptly subsided. A month after the operation the patient had vision of twenty-fiftieths in each eye, and probably would have shown better vision with carefully chosen glasses. Both eyes had become entirely quiet.

In June, 1896, fifteen years after the original trouble, the patient, who had not for some time been under his care, again sought advice of Dr. Henry, and was referred to me.

August 1, 1896. For some years after the first attacks of glaucoma her eyes had remained well. Then the right eye began to suffer from rainbow rings around the light, and obscuraton of vision. She then resorted to eserine, which promptly relieved the attack. But such attacks recurred and gradually grew worse. She still used the eserine, which partly preserved its beneficial influence. But the eye continued to grow worse with each attack, until more than a year ago all vision had been lost.

She now presented in the right eye a dark pericorneal zone of redness and greatly injected anterior veins. The anterior chamber was almost obliterated. The pupil was 3 mm. in diameter, and fixed. The media were hazy, leaving a fair fundus reflex, without any details of the fundus being visible. The right eye is constantly and extremely painful, the pain impairing her general health. She came for relief from pain, which eserine no longer helped, although it continued beneficial up to a few months ago, and she still continued to use it. The tension of the eyeball was + T. 2.

The left eye is free from redness and presents an upward iridectomy of $\frac{1}{6}$ of the iris. There is incarceration of the iris at the angles of the wound, and at the outer angle a slight pigment mass, small cystoid cicatrix. The anterior chamber was very shallow, the lens slightly hazy.

August 3d. With the hope of saving the eyeball, the patient was etherized and a large upward iridectomy done on the right eye. One-fourth of the iris was removed, and the lens was extracted. One hour later great pain in the eyeball set in, and subsequently there was evidence of bleeding. The next day there was a large clot in the conjunctival sac, and the vitreous and shreds of retina were hanging from the wound.

The vitreous and the retina with clot were cut off and the lips of the wound drawn together. The globe, however, continued hyperæmic. The upper margin of the cornea became somewhat infiltrated, and the infiltration extended slowly downward. The eye continued very painful.

20th. The patient was again given ether and the eyeball removed. Healing was subsequently normal; the pain relieved.

The left eye continued well. Careful ophthalmoscopic examination showed slight striation in the periphery of the lens, the choroid patchy and thinned, the optic disk of good color, with a cup extending almost its whole width, 1 to 1.5 D. deep, with abrupt edge upward and inward, but not downward and outward. The retinal vessels appeared normal.

The ophthalmometer showed 2.5 D. of corneal astigmatism; but by skiascopy and with test lenses her correcting lens was found to be -2.5 D. sph. $\odot + 6$ D. cyl. ax. 145° , with which vision = $\frac{1}{3}$ full.

A careful study of the field of vision with tests 1 centimetre square showed no perceptible narrowing of the field in any direction for either form or color.

This patient, with both eyes strongly predisposed to glaucoma, had a mydriatic used in what was then decidedly the worse eye of the two, producing a rather violent glaucomatous outbreak. But this being recognized promptly and treated efficiently, she has, as the final outcome of the disease in it, a good and serviceable eye sixteen years afterward. The other eye, showing some signs of the same condition, was treated with eserine, with the most excellent immediate result. Indeed, months afterward the case was accurately reported as one of a cure of one eye by eserine, equal in all respects or superior to the cure of the other by iridectomy. Nevertheless, the increased tension returned, and, running the usual course with exacerbations, each of which at first yielded promptly to the eserine, the result was in the end complete blindness and the necessary enucleation of the eye for the relief of intolerable pain.

The following case also illustrates the dangers of over-confidence in the efficiency of eserine, and of the yielding to the natural inclination to avoid an operation :

CASE III. —Miss T., aged about fifty-five years, suffered during February, 1882, from a sharp attack of facial erysipelas, with great swelling of the eyelids and suppuration of the lids of the right eye. In the latter part of the month, while convalescing from this attack, she was suddenly affected with acute inflammatory glaucoma of the left eye.

I saw her in consultation with Dr. Jacob Price, of West Chester, on the 28th of the month. In the left eye vision was reduced to counting fingers at eighteen inches; the pupil was widely dilated; the anterior chamber shallow, the cornea, and also the lens, hazy. The right eye had vision of four-twentieths, with cortical opacities in the periphery of the crystalline lens.

Iridectomy was advised and urged, but was not consented to and performed until March 14th, when the upper fifth of the iris was removed up to the ciliary border. Healing was prompt and normal. No relapse of the erysipelas occurred.

One week after the operation on the left eye, the right eye showed impaired vision, dilated pupil, and increased tension. Under eserine it promptly returned to normal tension, and vision of four-twentieths. After this the eyes continued normal, and vision remained unchanged for eighteen months, although there was increasing opacity in the periphery of each lens. Vision in the left eye had only risen two two-hundredths, with a very small visual field.

The patient refused to have her good eye operated upon, passed from under my care, sought other advice, and was given the opinion by a prominent ophthalmic surgeon that she was suffering from incipient cataract, and that neither eye presented the slightest symptom of glaucoma, which opinion she showed in writing for my edification.

In October, 1888, I was again asked to see her, and found each eye presenting an almost mature cataract. But the right eye was absolutely blind, and of stony hardness. The left eye had good quantitative perception of light, and no decided increase of tension. Her history of the interval showed that reliance had been placed on myotics, and these had for a time given relief. But the disease had slowly run its course in the right eye to complete blindness, with very great pain. The pain had now, however, subsided.

At the patient's solicitation the cataract was extracted from the left eye, giving improvement of light perception, but no useful vision.

In this case, with one eye already practically lost and the other free from any manifestation of glaucoma for many months after the use of a myotic, there was great reason to hesitate about urging iridectomy. Yet the preservation for several years of some vision in the eye upon which iridectomy had been done, after it had been so badly damaged to start with, seems to indicate distinctly that an early iridectomy might have saved useful vision in the right eye throughout life.

The physician, accustomed to trust to the influence of drugs and the recuperative powers of nature, and knowing that myotics do exert a markedly beneficial influence in many cases of glaucoma, is very likely to feel that the urgency of the ophthalmic surgeon, to open the eye and cut away a piece of the iris in such cases, is evidence of an excessive desire to operate. In this instance nothing could be further from the truth. The well-informed ophthalmic surgeon, knowing the insidious and deadly character of the affection, would usually be very willing to see his glaucoma patients go to some one else for either advice or operation. The fact is, he knows the persistent, progressive malignancy of the condition; and if he fails in the performance of his whole duty it is quite as apt to be by refraining from urging strongly enough an operation that he knows might also possibly fail to give permanent relief, and so might bring discredit upon him.

It is quite noticeable that writers on ophthalmology, in the last few years, while recognizing the influence of myotics in the palliation of glaucoma, almost without exception warn their readers against putting

their trust in these remedies as a means of curing or of permanently holding in check the morbid process.

The number of cases of glaucoma reported as cured by eserine and pilocarpine is not very large, and most of these have been reported within one or two years after the cessation of the glaucomatous attacks. It will be noticed that either Case II. or Case III., as given above, might have been equally well reported as a cure with eserine two years after the cure was supposed to be complete.

S. Snell reported a case of a glaucomatous attack caused by atropine where the eye remained well seven years afterward; but the patient, going to India, lost his sight within two years, although it was only probable that this was due to glaucoma. I have operated for an acute glaucomatous outbreak upon an eye still retaining useful vision ten years after a positive diagnosis of glaucoma had been made, no treatment having been resorted to during that interval. And Priestley Smith reported a case¹ in which the positive diagnosis of glaucoma was made by William Bowman nearly twenty years before operative treatment was undertaken, yet iridectomy gave an excellent result in each eye. Evidently, two or three years is not long enough time to establish the permanence of a cure of glaucoma. On the other hand, there have been a few cases reported of apparently permanent cure. Thus, 'Pye Smith narrates one' of a single outbreak following the use of atropine, where the patient remained free from symptoms of glaucoma until her death, about six years later.

It is noticeable that in all cases of apparently permanent cure of glaucoma by myotics the drug has been resorted to at a very early stage of the disease. In a large number of cases it gives, at this early stage, prompt relief from the attack. Later, its influence is still markedly beneficial, but the relief is not complete; and at a still later stage it loses all power of diminishing intraocular tension or lessening the severity of any of the symptoms of glaucoma.

The earlier writers upon the subject found eserine, like other remedial measures, less efficient in simple than in inflammatory glaucoma, and many regarded it as useless in simple glaucoma. Later observations seem to show that in the earlier stages of simple glaucoma it may beneficially influence the course of the disease. Thus, de Schweinitz² reports a case in which, under its use, there was a gradual widening of the fields of vision and complete restoration of the field previously lost.

Zentmayer and Posey³ conclude, from a study of 167 cases, "that the effect of the administration of eserine and of the performance of iri-

¹ Ophthalmic Review, 1885, p. 261.

² Trans. Oph. Soc. of United Kingdom, vols. II. and VII.

³ Ophthalmic Review, 1894, p. 222.

⁴ Will's Eye Hospital Reports, 1895, p. 82.

deectomy in checking the course of the disease is proportionately the same in the treatment of simple glaucoma. As operative procedures are always to be deprecated when other measures are equally valuable, eserine should be employed in all cases of the disease." But their cases were not under observation long enough to test the permanence of the benefit.

SUMMARY. With reference to the use of mydriatics, we are justified in saying:

In general, they should not be applied to eyes that are glaucomatous or upon the verge of glaucoma. In such eyes the dilatation of the pupil they commonly produce is dangerous, and may cause increase of intraocular tension, which, if not speedily relieved, will do permanent damage. But the risk of this effect from a mydriatic is not to be guarded against by fixing an age limit before which mydriatics may be considered safe and after which they should not commonly be employed. In the great majority of eyes a mydriatic cannot cause glaucoma at any time of life, while, on the other hand, a few patients are affected with the disease even from childhood. The danger is best guarded against by bearing in mind the symptoms of glaucoma, and always looking for them before ordering a mydriatic, especially by a careful ophthalmoscopic examination.

In very rare cases careful examination may not reveal the imminence of glaucoma, yet when the mydriatic has been used the outbreak may occur. In such a case the usual remedies for glaucoma should be promptly resorted to. The mydriatic should be stopped and irideectomy strongly urged. With the proper irideectomy promptly done the prognosis for complete permanent cure is excellent, the results being decidedly better than in cases discovered at a later stage when the glaucomatous outbreak has occurred spontaneously. Indeed, if the patient permits the proper, immediate treatment of his case, the fact that an outbreak of glaucoma has been evoked by the use of a mydriatic is probably a cause for congratulation rather than for regret. For the eye was, in all probability, doomed to the disease, and the earlier application of the remedy gives the better chance for complete and permanent cure.

I believe it would be perfectly proper, after explaining the matter to the patient, and getting his assent to prompt irideectomy if it should be indicated, to use homatropine as a test for the presence of glaucoma at the earliest stage in doubtful cases.

If the patient refuses irideectomy, eserine should be promptly resorted to in such strength and with such frequency as may be necessary for the reduction of the pupil. In the case of a glaucomatous outbreak following the use of a mydriatic more persistent in its action than homatropine, it would be proper to shorten the period of mydriasis by tapping

the cornea and evacuating the aqueous humor, preparatory to the efficient use of eserine.

In any case of glaucoma in which the pupil is firmly bound down by adhesions, or is otherwise so fixed that mydriasis cannot cause thickening of the iris opposite Fontana's space at the angle of the anterior chamber, especially if the application of eserine aggravates the symptoms, it is justifiable to apply atropin or some other mydriatic, and in a small proportion of cases such applications will be of marked benefit.

Myotics are beneficial in glaucoma only when the pupil is still movable; that is, chiefly in the earlier stages. When not beneficial, they are usually distinctly injurious.

If for any reason iridectomy cannot be done, myotics are always to be tried in the earlier stages of the disease. If they cause marked improvement they may be continued so long as they cause improvement. If they reduce the eye tension they may be continued so long as they keep the tension down; if they promptly relieve attacks they may be continued so long as the attacks are rendered less severe and frequent, and leave no permanent impairment of function, either of central vision or of the field, in the interval. But in the vast majority of cases there will come a time when the influence of the myotic, although still favorable, is less favorable than it has been; and after this it is liable rapidly to lose its power to do any good at all. Hence, whenever this period arrives the patient should be warned that the myotic is insufficient, practically worthless, and an operation, preferably iridectomy, gives the only chance for escaping complete blindness, and, perhaps, intense suffering.

THE DESCRIPTIVE ANATOMY OF THE HUMAN HEART.

BY WILLIAM KEILLER, F.R.C.S. ED.,
PROFESSOR OF ANATOMY, UNIVERSITY OF TEXAS.

THE magnificent work of Braune and His has, within the past decade, revolutionized many sections of descriptive and topographical human anatomy. Till lately, dissection of the fresh or imperfectly-prepared subject was the only means used to arrive at a knowledge of the form and relations of each structure; but within recent years the examination of the body made while frozen, and the dissection of subjects hardened to comparative rigidity by continued intra-arterial infusion of such hardening agents as chromic acid, chloride of zinc, or corrosive sublimate, have corrected grave errors which had arisen from the exclusive study of the organs in the flaccid condition met with when ordinary methods are used. Even on the post-mortem table, and

within thirty-six hours of death, the liver, spleen, and heart "flop" out of all shape (I can think of no more expressive word, if it be somewhat inclegant), and are no more like the same organs as seen when hardened *in situ*, than the jelly-fish, half embedded in the sand—a shapeless and repulsive mass—resembles the living embodiment of symmetry and heanty propelling itself through the clear blue water. What, then, must be the condition of the same organs weeks or months after death, in bodies preserved by freezing or by arsenical solutions which do not harden the tissues? Verily, such organs are the despair of the medical student, and those who have never seen hardened organs may well be excused should they regard the models of His and allied descriptions with a certain amount of respectful incredulity. Such, I confess, was my own feeling toward them till, on the adoption of my present method of preserving bodies, I found to my surprise that these and other organs were thereby sufficiently hardened to present almost perfect counterparts of these models, without any interference with the methods of dissection. Thus there is now in my dissecting-room scarcely a liver, kidney, or spleen removed by the student from his subject that does not exhibit in perfection all the surfaces, borders, and impressions described and modelled by His.

While the text-book descriptions of liver, kidney, and spleen have been changed to accord with recent views, it is somewhat strange that the heart is still portrayed as it used to be many years ago; and that, though it requires the most vivid imagination and elastic conscience to reconcile the description with the accepted model of His; and this is still more strange, since clinicians have found the text-book descriptions of the organ so utterly inadequate that they have had to invent terms of their own in order to indicate anatomical facts in the living—terms which have no place in the dissecting-room vocabulary. I have long felt that, though the description of the heart as presenting a base, apex, right and left borders, and anterior and posterior surfaces is sufficient to describe the flabby, shapeless mass one finds on the post-mortem table when the excised organ is there before one, yet it is useless as applied to His's model or my own specimens hardened *in situ*. I have, therefore, for the past few years described in my lectures what I saw before me, without reference to the text-book; and I feel that the matter is of sufficient importance to merit presentation to my brother anatomists. When I consider that my own description is immensely more complex than that now in vogue, I feel some little compunction in suggesting an additional burden to the already sorely-laden student of anatomy; but I am encouraged by the remembrance of what has happened in the case of the liver. That organ, which, in the primitive simplicity of old text-book descriptions, had only two borders, two surfaces, and no impressions at all, has now five borders, as many surfaces,

and eight impressions; but everything is so definite, its relations are so evident, and the picture can be so vividly printed on the brain that what was before a pure matter of memory and a puzzle to the student, is now easily described and readily understood and remembered.

First, let me allude to the inconsistencies in our accepted descriptions. The pericardium is spoken of as cone-shaped, its apex upward, its base resting on the diaphragm. Yet the heart, which, with the commencement of the great vessels, completely fills it, is described as a cone with its apex directed downward, forward, and to the left, and its base upward, backward, and to the right. But this is a small matter, and probably justifiable; graver inconsistencies are to come.

Clinical manuals, such as Gibson and Russell's *Physical Diagnosis*, and articles on topographical anatomy, such as that in Morris's *Treatise*, discard the word "base," or explain that in their use of it they mean the "upper limit;" use "lower border" to signify what in the dissecting-room we call the "left border," apply the term "right border" to what in the dissecting-room we do not describe at all, and their "left border" is anything but synonymous with the left border of the descriptive anatomist.

Having, I trust, succeeded in showing that some change is necessary, I shall endeavor to submit to you a description of the external configuration and relations of the human heart which shall be accurate, concise, and free from redundancy. I would beg that those who honor my description when in print with a careful perusal, will compare it and the illustrations with the model by His, and those who desire to verify it in the dissecting-room may do so in any body injected through the right common carotid or femoral artery with a gelatine injecting mass.¹ The drawings are made from a rather enlarged specimen, of which the right side was filled with coagulated blood and the left side with injection mass; but, though large, it agrees in all essential matters with His's model and many other dissecting-room specimens I have carefully examined. My description is markedly borne out by vertical sagittal mesial and vertical coronal sections of the frozen body; horizontal section I have not yet been able to compare it with.

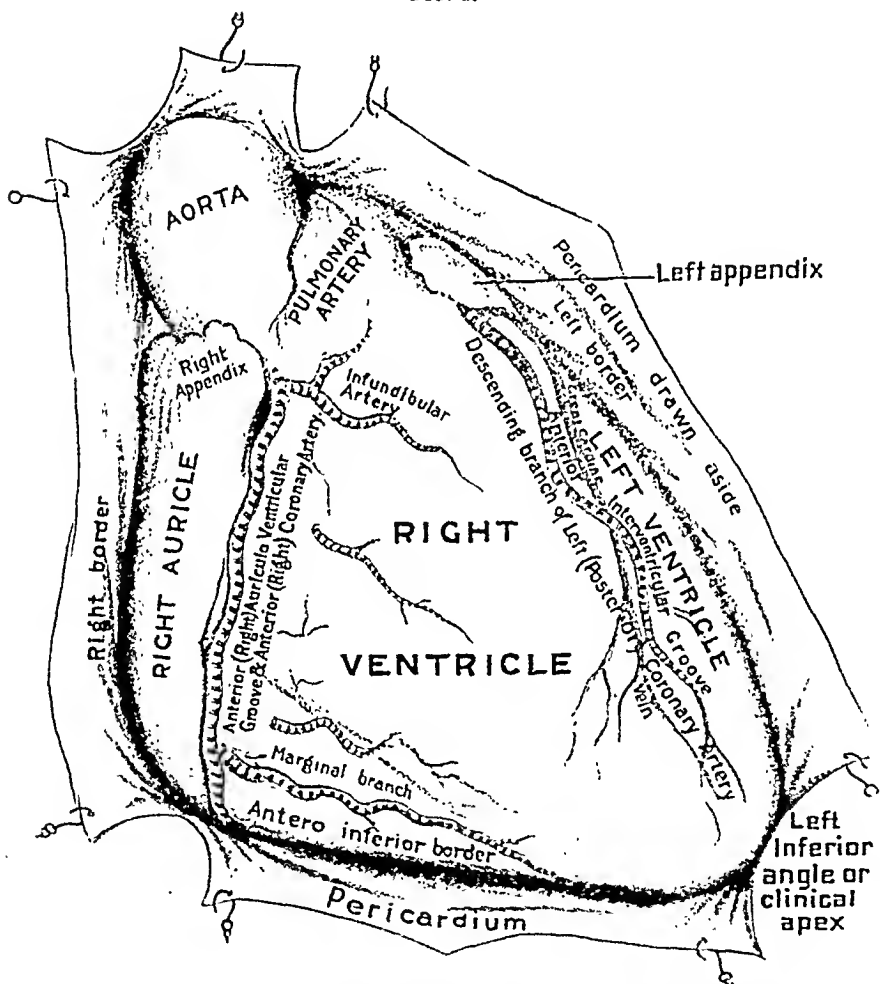
Thus viewed, the heart is an irregular, four-sided pyramid, whose base rests on the diaphragm, and whose apex has been, as it were, removed to afford attachment for the ascending trunks of the great vessels. It thus presents for examination five surfaces (including the base), borders separating these, an anatomical apex, and a "clinical apex," a term which I feel compelled to retain because it is almost inseparable from physiological and clinical phraseology.

The anterior surface (Fig. 1), the first which meets the eye when the

¹ My description is beautifully illustrated by specimens obtained from bodies prepared by injections of formaldehyde (5 per cent. of a 40 per cent. solution).

chest and pericardium are opened, is triangular in shape, slightly convex, and is directed forward and a little upward, being in sagittal mesial section parallel with the sternum. It includes the greater part of the right ventricle, and portions of the left ventricle, left auricular appendix, the whole right appendix, and part of the right auricle. It is bounded below by the sharp, almost straight antero-inferior border (*margo aentus*), on the left by the oblique, convex, and slightly rounded left

FIG. 1.



Anterior surface of the heart as seen in situ when the pericardium is opened.

anterior border (the left border of clinicians), and on the right by the nearly vertical and convex right anterior border (the "right border" of clinicians). Its superior angle marks the anatomical apex, and here the surface merges in the anterior walls of the aorta and pulmonary artery. Its left anterior angle forms the clinical apex.

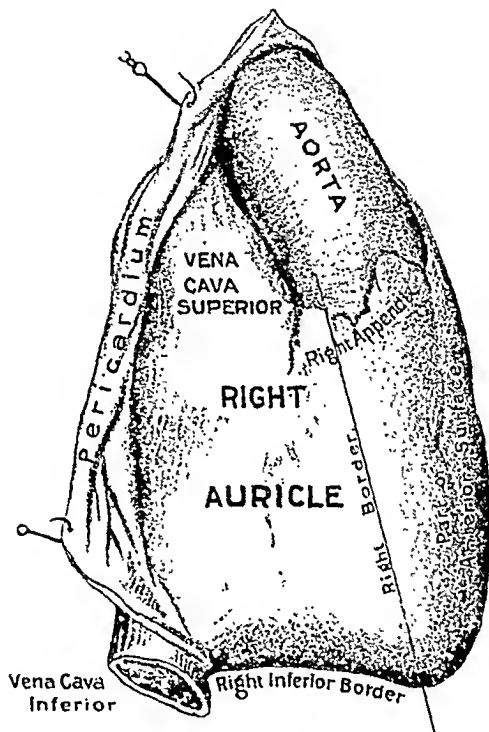
On this surface are seen the anterior or right coronary artery in the anterior auriculo-ventricular groove, while its marginal branch runs

along the antero-inferior border; and in the anterior interventricular groove is the descending branch of the posterior or left coronary artery, accompanied by the great cardiac vein.

Relations. Separated from it by the pericardium are the margins of the lungs and pleuræ, the sterno-pericardial ligaments, triangular sterni, internal mammary vessels, and sternum.

The right surface (Fig. 2) is markedly convex, four sided, lies almost vertically, and is directed toward the right. It includes the greater part

FIG. 2.



Right surface of the heart.

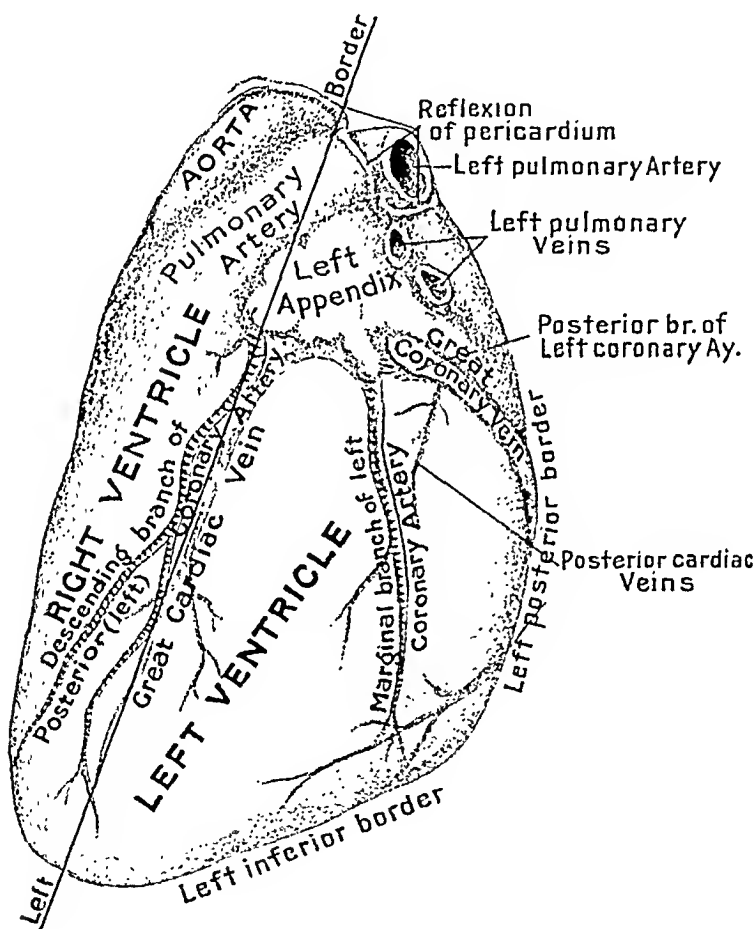
of the right auricle. Its anterior, posterior, and inferior borders are only slightly rounded, and are therefore fairly well defined. At its superior extremity the surface blends with the wall of the superior vena cava, and at its posterior inferior angle it is similarly related to the vena cava inferior.

Relations. It is separated by pericardium from the right phrenic nerve and vessels, pleura, and inner surface of the right lung.

The left surface (Fig. 3) is a convex, triangular area, directed mainly upward and toward the left. It includes about one-half of the free surface of the left ventricle and the left auricular appendix. It is

separated from the anterior surface by the left border; from the inferior surface by a rather sharp left inferior border, and behind it is bounded by the left pulmonary veins and left auriculo-ventricular groove with the coronary vein embedded therein. It presents the proximal extremities of the descending branch of the left coronary artery and great cardiac vein, the marginal and transverse branches of the same artery, and the posterior cardiac and coronary veins.

FIG. 3.



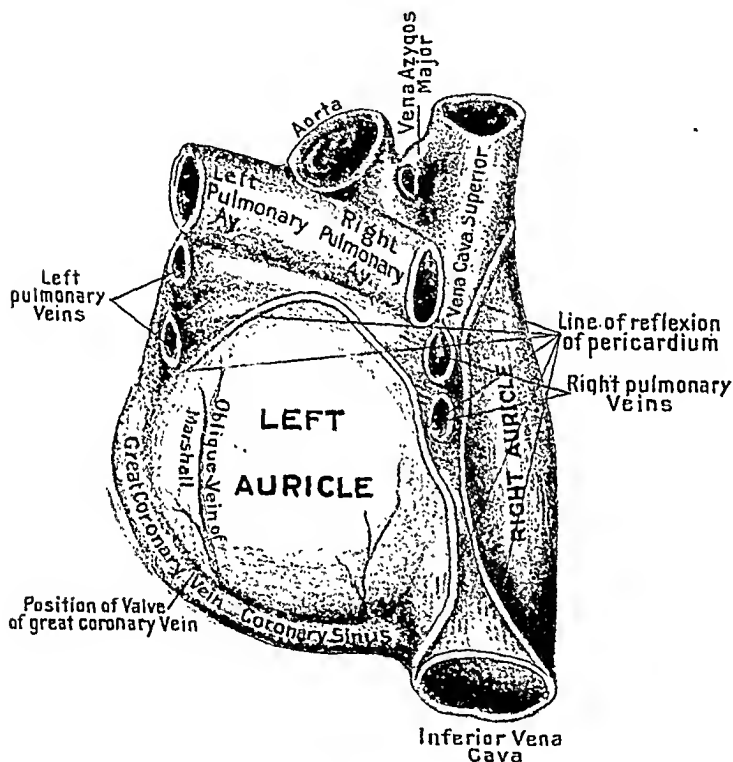
Left surface of the heart.

Relations. It is separated by pericardium from the left phrenic nerve and vessels, left pleura, and inner surface of the left lung.

The posterior surface (Fig. 4) (dorsal surface) is called the base in text-book descriptions. It is four-sided, rather narrower above than below, is convex, vertical, and directed backward. It is formed by the left auricle and by the portion of the right auricle which joins the two venæ cavae behind, and is bounded by rather sharp and well-defined borders. It is bounded below by the inferior vena cava and the coro-

nary sinus, above by the right pulmonary artery, on the right by a fairly defined border joining the two venæ cavæ, and on the left by the cardiac openings of the left pulmonary veins and by the great coronary vein. It presents the openings of the coronary veins (right and left), the great coronary vein and coronary sinus, and the oblique vein of Marshall, which last runs downward over the surface to enter the left extremity of the coronary sinus. It is only partially invested by the serous layer of the pericardium.

FIG. 4.



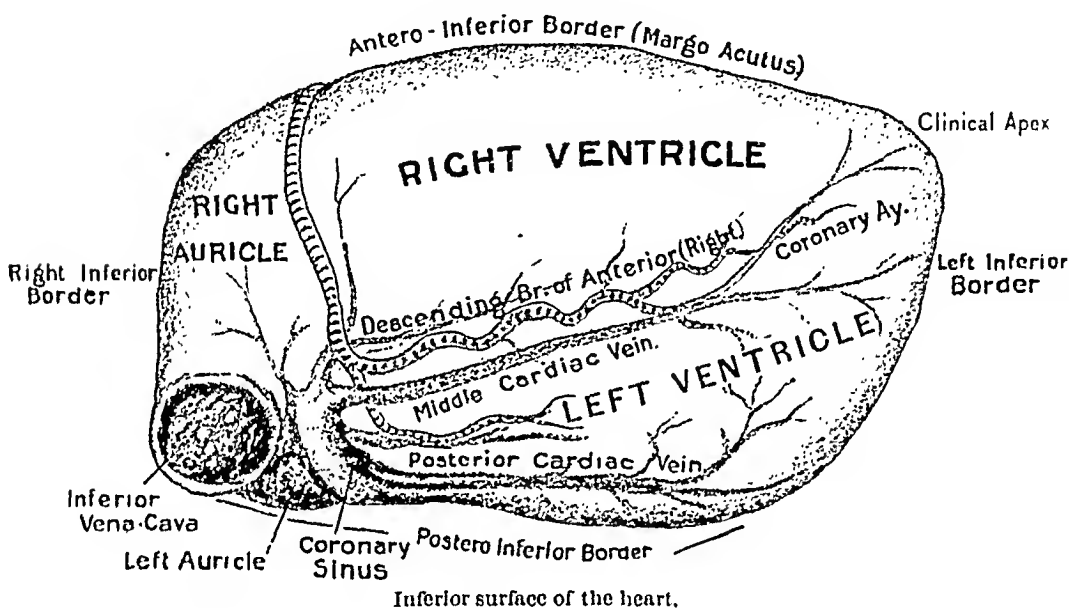
Posterior surface of the heart.

Relations. It is separated by pericardium from the bronchi, œsophagus and vagi, descending aorta, vena azygos major, and thoracic duct.

The *inferior surface* (Fig. 5) (diaphragmatic surface or *base*) is quadrilateral, slightly convex or almost flat when the ventricles contain blood, slightly concave when they are empty and relaxed. It is directed downward and a little backward and toward the right, and is bounded by rather sharp and well-defined borders. It is formed by a small portion of the right auricle and opening of the vena cava inferior, the rest of the surface being about equally divided between the right and left ventricles.

Behind the vena cava is seen a small portion of the left auricle. In addition to the inferior caval opening, it presents the inferior extremities of the right (anterior) and left (posterior) interventricular grooves, with the right coronary artery embedded in the former and the coronary sinus in the latter. Crossing it diagonally is the inferior interventricular groove, with the descending branch of the anterior (or right) coronary artery and middle cardiac vein. The posterior cardiac vein runs along its posterior border.

FIG. 5.



Relations. It is separated by the central tendon of the diaphragm and some diaphragm muscle from the superior surface (impressio cardiaca) of the liver.

The apex of the pyramid is formed by the aorta (Fig. 1), pulmonary artery (Fig. 3), and superior vena cava (Fig. 2), and these structures spring from the heart on a level with the upper margin of the third costo-sternal articulation, extending an inch and a half to the left and one inch to the right of the middle line. This we may conveniently name with clinicians the upper limit of the heart.

SUPERFICIAL INDICATIONS. The upper limit of the heart has just been indicated. The left half of this line will mark the position of the pulmonary and aortic valves.

The clinical apex is indicated by a point between the fifth and sixth ribs, three and one-half inches to the left of the middle line.

The antero-inferior border is to be indicated on the chest-wall by an oblique line, slightly convex downward, extending from the clinical apex on the left across and slightly upward to a point one inch to the

right of the middle line at the level of the sixth chondro-sternal articulation. Along this line the cardiac blends insensibly with hepatic dulness.

These lines being drawn, the right and left borders of the heart's anterior surface or the absolute lateral limits of the heart's dulness will be defined by convex lines joining respectively their right and left extremities. Thus, on a level with the fourth chondro-sternal articulation, the area of the heart's dulness extends three inches to the left and one and three-quarters inches to the right of the middle line.

It would seem more consistent with the above description to change some other elements in the cardiac nomenclature. For instance, the interventricular grooves are seen to be superior and inferior. The *right coronary* artery I would name *anterior*, and its branches respectively infundibular (as at present), right ventricular (now "marginal"), and inferior interventricular (now descending); the left coronary artery would be better named *posterior*, and its branches superior interventricular (now "descending"), left ventricular (now marginal), and auriculo-ventricular (now transverse).

RELATIONSHIP OF MIGRAINE TO EPILEPSY.

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ALL writers on this subject are agreed that migraine and epilepsy are kindred diseases, and that this kinship is so close that these diseases are not infrequently twin inheritances from the same neurotic ancestors.

Concerning this relationship, Landon Carter Gray says:¹ "Some eleven years ago I called attention to the association of epilepsy with migraine, not knowing till some time later that Tisset, Parry, and Living had previously observed the same association. In these cases epilepsy alternates with migraine, the migraine disappearing when the epilepsy appears, and the epilepsy returning when the migraine disappears. By this I do not mean to say that all cases of migraine are subject to epilepsy, but I do mean to say that there is a very close relationship between migraine and epilepsy, and in some cases the relation is so close as to permit of this alternation; indeed, almost all cases of migraine will be found at some period of their lives to have had a loss of consciousness, with or without convulsive movements, although generally this fact is strenuously denied."

On this same subject B. Sachs² speaks as follows: "The relation of

¹ *Nervous and Mental Diseases*, 1895.

² *Nervous Diseases of Children*, 1895.

migraine to epilepsy makes it also more probable that some primary peculiarity of the cortical cells is responsible for this painful affection. The resemblance is so close, and the sequence of the two diseases is so striking, that the two forms of disease may possibly represent a different degree of affection of the cortical structure."

In this connection A. Eulenburg¹ may thus be quoted: "In those epileptics who are predisposed by inheritance and constitution, attacks of migraine are among the commonest accompaniments of developed epilepsy both in early and in later years; and that in families which have tendencies to constitutional neuropathic diseases there are often individual members who suffer with migraine while others are attacked with epilepsy."

In the above quotations I have clearly and briefly set forth, in language not my own, that the kinship of migraine and epilepsy is one of the facts and not one of the theories of medicine, that I may at once follow the intent of this paper, which is to point out the manner of this relationship.

In the beginning of this study it is necessary that one should have and hold in mind a clearly defined clinical picture of both migraine and epilepsy, since these terms, in the present state of our knowledge, have a clinical rather than a pathological or etiological significance.

MIGRAINE is a name which has been given to a group of paroxysmal nervous symptoms which recur, as a rule, at irregular intervals. This symptom-group which we call migraine, *regardless of its etiology*, embraces the following more or less characteristic symptoms, viz.: Recurring paroxysmal headaches, commonly unilateral and associated, as a rule, with nausea. These headaches are self-limited, and not infrequently subside into a narcosis which produces a sleep from which the patient awakens refreshed and free from pain.

EPILEPSY is likewise a name which has been given to a group of paroxysmal nervous symptoms which recurs, as a rule, at irregular intervals. This symptom-group, which we call epilepsy, *regardless of its etiology*, embraces the following more or less characteristic symptoms, viz.: Recurring convulsive seizures, more or less general, and commonly accompanied by temporary loss of consciousness, loss of pupillary reflex, and dilatation of pupils. These convulsive seizures are self-limited, and commonly subside into a narcosis that produces a sleep from which the patient awakens convalescent from the attack.

It will also be well to hold in mind that in both migraine and epilepsy we may have among the early symptoms a slow pulse with high arterial pressure, visual disturbances, and temporary aphasia.

A clear conception of the etiologies of the symptom-groups here pre-

¹ Ziemssen's *Cyclopaedia*, 1877.

sented is absolutely necessary to the full understanding of the relationship which exists between migraine and epilepsy. If we wish to make out the manner of their kinship we must know their antecedents, we must know from what they descended; in short, we must have their family tree. While, at the present time, this desideratum is not attainable, yet this paper is offered in the hope and belief that we have even now sufficient knowledge of their antecedents to make out in a crude way the nature of their relationship.

ETIOLOGY AND PATHOLOGY OF MIGRAINE. To show our present knowledge of this subject I shall briefly quote three of our most recent writers. B. Sachs¹ says: "Since an anatomical basis is wanting, the opportunity for theoretical speculations regarding the pathology of the disease is all the greater, and has been improved by numerous writers. There can hardly be a doubt that changes in the blood-supply of the brain or its coverings are primarily responsible for the symptoms of migraine. There is also reason to believe that the sympathetic nervous system is largely involved in this disease."

Landon Carter Gray² says: "The pathology of migraine is unknown. . . . There has been for many years a question as to whether it was of vasomotor origin, and an attempt was made to base this upon the coloration of the face; but as this hue varies very greatly in different cases, and as there has been no proof whatsoever of the vasomotor origin, this theory remains a pure theory, worthless for any practical purposes."

James C. Wilson,³ 1895, says: "The essential pathological process is unknown. There are no anatomical lesions. Three principal theories have been advanced: 1. That the disease is a vasomotor neurosis. . . . 2. That it is a form of neuralgia. . . . 3. The view at present generally accepted is that of Liveing, that migraine is a fulminating neurosis, in which there are periodical discharges, or nerve storms, from sensory centres corresponding to the periodical discharges from motor centres in epilepsy."

From these quotations it is plain that we know absolutely nothing of the essential pathological processes underlying migraine, and in our search through the literature of the pathology of this condition we learn that only two propositions have found a reasonable degree of acceptance in the medical mind: 1. The sensory neurons of the cerebral cortex play some rôle in the pathology of these attacks. 2. Reflex irritation, starting from the eye, the pelvis, the intestinal canal, or elsewhere, may be the exciting, but not the essential, cause of a migrainous attack. Such is the meagre sum of our knowledge of the pathology of migraine.

¹ Nervous Diseases of Children.

² Nervous and Mental Diseases.

³ Nervous Diseases, by American Authors.

At this point I ask attention to the contributions which I have made to the pathology of this subject during the past three years. In November, 1894, I published a paper¹ entitled "Uric Acid Leucomaines as Factors in the Etiology of Migraine and Kindred Nervous Diseases." In this paper I recited the history of a patient suffering from migraine, and expressed the opinion that the large excess of paraxanthin, which appeared in the urine of this patient during and immediately following an attack of migraine, was an etiological factor in the production of these attacks. In June, 1895, I continued the study of this subject under the title² "Leucomain Poisoning." In this paper it was clearly demonstrated that an excessive excretion of paraxanthin was coincident with these severe migrainous attacks, and I therein expressed the belief that the paraxanthin was the direct cause of the migraine. From that time to the present I have continued the study of this subject, with the result that I am now convinced that paraxanthin is an all-important factor in the production of true migraine. This conviction has been forced upon me by the following facts, which I have repeatedly demonstrated:

1. Paraxanthin is found in normal urine in such small quantities that its poisonous properties are lost in dilution. Salomon found only 1.2 grammes in 1200 litres of normal urine; this quantity is so minute that its presence cannot be satisfactorily demonstrated in such quantities of normal urine as can conveniently be obtained from patients. In four litres of normal urine I have repeatedly failed to demonstrate the presence of paraxanthin.

2. During the past three years I have examined the urines excreted during attacks of supposed migraine, of more than half a hundred patients, and I have to record but few instances in which I failed to find paraxanthin in great excess in this urine. From the large number of examinations I have made, I believe I am justified in saying that there can be but little doubt that paraxanthin is found in enormous excess in urines excreted during attacks of true migraine. In fact, paraxanthin occurs in such great excess in migrainous urines that I now never require more than one litre (and oftentimes get less) for demonstrating its presence, and even from so small a quantity I rarely fail to demonstrate its presence in the "final fluid" by the physiological and chemical tests described in my previous papers.³

By way of parenthesis, I here wish to say that some of the migrainous attacks which I have found to be coincident with an excessive excretion of paraxanthin occurred at or near the menstrual time, and that

¹ Medical News, November, 1894.

² Transactions of the Association of American Physicians, 1895, and Medical Record, June 22, 1895.

³ "Leucomain Poisoning," Transactions of the Association of American Physicians, 1895-96.

the headaches having such an association not infrequently ceased at the menopause. But in connection with this clinical fact it must also be remembered that the menstrual epoch is not a necessary factor in the production of paraxanthin headaches (migraine). In the same individual we may have an intermenstrual headache which is the exact counterpart of the menstrual headache, and I have also found that these paraxanthin headaches not infrequently continue after the menopause. Moreover, the same type of headache may occur in men, and in children before the onset of the menstrual function. These facts suggest that the relation of the menstrual epoch to paraxanthin headaches (migraine) is a complicated one. The discussion of this relationship is not within the scope of this paper.

3. Paraxanthin is not excreted in excess in the urines of migrainous patients at any other time than during an attack of migraine.

4. Paraxanthin does not occur in excess in the urine of patients suffering from severe forms of headache other than migraine. I have repeatedly failed to find paraxanthin in the urines of patients suffering from intestinal, influenzal, malarial, and nervous headaches, and for these reasons have concluded that the headaches of migrainous attacks do not produce the paraxanthin.

5. There is physiological evidence that paraxanthin is not formed in the kidneys during the process of excretion. Its presence, therefore, in increased quantities in the urine means that it was present in the blood in increased quantities directly before it appeared in the urine. Paraxanthin is excreted from the blood by the kidneys into the urine.¹

6. Paraxanthin is the most poisonous leucomain of the uric acid group. It is, in fact, so poisonous that it would be strange indeed to learn that so large a quantity of this substance as is excreted during a migrainous attack could pass through the blood of a patient on its way to excretion without producing nervous symptoms.

7. Certain of the symptoms of experimental paraxanthin poisoning are very like those of a patient suffering from migraine. It is, of course, impossible to determine whether or not the animal experimented upon has headache. But the general nervous irritability, increase of reflexes, and late narcotism are present in both conditions.

In the light of the above propositions, it seems to me quite impossible to avoid the conclusion that paraxanthin is one of the important factors of true migraine. But, even if one concedes this relationship, the etiology of migraine still remains very obscure, since there are many difficult questions concerning paraxanthin yet to be solved. For example, we do not know how paraxanthin produces the symptom-group which we

¹ It is also excreted into the small intestine, but this manner of excretion does not concern our present study.

call migraine. Does it act directly on the nerve elements of the central nervous system, or does it act through the vasomotor nerves on the blood-supply of the brain? We do not know where paraxanthin is formed, where it is stored, and what conditions are necessary to cause its sudden appearance in large quantities in the blood, nor do we know how reflex and other factors act in precipitating an attack of migraine. These and many other things concerning the etiology of migraine we do not know. Yet I must insist that our ignorance concerning these important questions is not a sufficient reason for our not accepting the one proposition concerning the etiology of this disease which I think has been satisfactorily demonstrated, viz.: *Paraxanthin is an important factor of true migraine.*

PATHOLOGY OF EPILEPSY. The term epilepsy is used much more loosely in medical literature than is the term migraine; it covers, in fact, all sorts of convulsive seizures, be they ever so slight, and embraces, therefore, a number of pathological conditions which will, no doubt, in time be separated and classified. When this classification is made it will, I think, be found that only one form of this so-called epilepsy is closely allied to migraine, and that all the other forms are so related only as they are to chorea, hysteria, and other neuroses, toward which one may be more or less predisposed by neuropathic inheritances. While at the present time it may not be possible to make a satisfactory etiological classification of epilepsies, yet the purposes of this paper demand that such a classification be attempted. For this reason, and for this reason only, the following classification is offered.

If the literature of epilepsy is agreed upon any one fact pertaining to its etiology, it is that the all-important factor in the production of epilepsy is an irritation of the motor neurons of the cerebral cortex, and upon this foundation-stone of cortical irritation I shall attempt to build an etiological classification of the various forms of epilepsy.

The irritation which causes the violent and rapid discharge of nerve force from the motor cells of the cerebral cortex (epilepsy) may be either chemical, mechanical, or reflex.

REFLEX EPILEPSY. In this type of epilepsy the cells of the cerebral cortex are influenced to discharge their energy by reflex excitation; but it does not follow from this that the reflex factor is the only or even the most important factor of this form of epilepsy. In truth, one may say that a lack of development of the inhibitory centres of the brain is of more importance than the reflex causes. The lack of inhibition makes it possible for the slightest reflex cause to precipitate a discharge of nerve-force, the manifestations of which we call epilepsy. While, therefore, the reflex factor may not be the all-important one, it is a necessary one, and for this reason we may class these epilepsies as reflex. Reflex epilepsy, as here defined, embraces a large portion of the so-

called idiopathic and developmental epilepsies. The lack of inhibitory development,¹ upon which this form of epilepsy depends, may be a matter of inheritance, or it may be due to malnutrition. Cases of reflex epilepsy are, therefore, not infrequently cured by a removal of the reflex cause, or by time, which allows for the development of the inhibitory centres, or by the cure of the malnutrition, but far more frequently it continues, and there is associated with it a degree of developmental idiocy due to a lack of development of higher functions of the brain. In these cases the cortical inhibitory centres remain undeveloped throughout life, and epileptic attacks continue to be precipitated by the slightest reflex excitation; it is evident that migraine is not closely related to this degenerate type of epilepsy, which I have here classified as reflex.

MECHANICAL EPILEPSY, otherwise known as focal epilepsy, has its origin in some mechanical irritation to the cells of the cerebral cortex. Mechanical injury to the brain may result from a foreign body, a fracture of the skull, a hemorrhage, or a new growth. In either event the mechanical irritant may produce a circumscribed meningo-encephalitis, resulting in more or less degeneration of the cells of the cerebral cortex and sclerosis of the neuroglia tissue. These secondary changes explain the continuation of the epileptic paroxysms after the original excitant has been removed. It has long been known that injuries to the skull, new growths, and cerebral hemorrhages are responsible for a large number of epilepsies; but a new interest has been added to this subject by the admirable clinical studies of B. Sachs, who demonstrated that many obscure epilepsies developed in childhood are focal epilepsies, having their origin in cortical hemorrhage which occurred in infancy. Enough has been said to show that mechanical epilepsy, apart from its classification, does not interest us in this study, since it is in no way etiologically related to migraine.

TOXIC EPILEPSY. There is a type of epilepsy which may be classed as toxic, the essential factors in the production of which are toxins produced in the body. Some form of auto-intoxication is, therefore, the prime factor in the production of all toxic epilepsies. Herter and Smith, in a very clever research,² have attempted to show that certain poisons formed in the intestinal canal may be important factors in the production of epilepsy. But our knowledge of the toxic epilepsies is so indefinite that it will not profit us to attempt a general consideration of this subject. I shall, therefore, ask attention only to one form of toxic epilepsy, namely, paraxanthin epilepsy. It is my belief that a not inconsiderable proportion of the so-called idiopathic epilepsies are produced by the irritating or toxic action of chemical products formed

¹ I noted the importance of lack of inhibition as a predisposing factor in producing epilepsy.
"The Neuroses of Childhood," 1895.

² New York Medical Journal.

within the body, and that they should, therefore, be classified as toxic epilepsies. However this may be, I am quite sure that there is one form of toxic epilepsy which is caused by the action of paraxanthin on nerve centres, and it is to this form of epilepsy that I would ask especial attention.

In May, 1894, I published a careful study¹ of a case of epilepsy, in which I demonstrated that the urine passed by this patient immediately following an epileptoid attack contained an enormous excess of paraxanthin, and that the paraxanthin solution separated from the urine of this patient would, when introduced in the peritoneal cavities of mice, produce convulsive attacks similar to those from which my patient suffered. I also demonstrated that the urine of this patient in the interval between these attacks did not contain an excess of paraxanthin.

In November, 1894, the study of this case was continued,² and I therein confirmed my previous observations concerning the relation of paraxanthin to these epileptoid attacks, and further noted the following important facts: Epileptoid attacks themselves will not explain the excessive quantity of paraxanthin which is invariably found in the urine of this patient, excreted during a convulsion. This conclusion was drawn from the fact that in two cases of epilepsy, one *grand mal* and the other *petit mal*, which I carefully studied, I failed to find an excess of paraxanthin in the urines excreted by these patients during their attacks. Here, by the way of parenthesis, let me note that I have, since the publication above noted, examined the urines of many epileptics, and have always failed to find an excess of paraxanthin in the urine passed by patients afflicted with focal or with reflex (hereditary) epilepsy. It is a fact, therefore,³ that the epilepsy does not produce the paraxanthin, and it is also a fact that the great mass of epileptics do not have an excess of paraxanthin in their urine.

In May, 1895,³ I concluded the study of this case in the belief that I had demonstrated, as clearly as could be demonstrated without experimentation on the human being, that paraxanthin was an essential factor of the epileptic paroxysms from which this patient suffered.

During the past three years I have examined the urines of a large number of epileptics, and have found that only a small proportion of them were suffering from *paraxanthin* epilepsy. In this study I have been impressed by the fact that it is almost impossible to make a diagnosis of paraxanthin epilepsy from the other forms of epilepsy of the *grand mal* type, from the clinical pictures alone. The urine examination is absolutely necessary to a satisfactory diagnosis. Paraxanthin epilepsy, however, presents certain clinical features which are quite sufficient to make

¹ Medical News, May 23, 1894.

² The Medical News, November 3, 1894.

³ Transactions of the Association of American Physicians, 1895.

one strongly suspect this type of epilepsy. For example, paraxanthin epilepsy makes its appearance, as a rule, in middle life, and always occurs in individuals who either now suffer or have suffered from migraine in early life.

Paraxanthin epilepsy also is more common in women than in men, and the attacks not infrequently occur at the menstrual period. This fact of itself is sufficient to make us suspect all menstrual epilepsies of belonging to this type. It is also important to note that paraxanthin epilepsy is not inconsistent with the greatest intellectuality, and that it is commonly associated in later life with arterio-sclerosis and the dangers consequent to this condition. But most important of all is the fact that paraxanthin epilepsy is much more amenable to treatment than the other forms of epilepsy. Its early diagnosis is, therefore, important.

Within the past two years I have had under observation a number of cases of paraxanthin epilepsy; the study of these cases has thoroughly convinced me that paraxanthin is the essential factor in the production of the epileptic attacks from which these patients suffer. From a quart of urine passed immediately following these attacks I am able to separate sufficient paraxanthin to kill a number of mice and a large-sized guinea-pig. In these experiments I have found the convulsions produced in the guinea-pig much more instructive than those produced in the mouse. When the final fluid containing the paraxanthin separated from a quart of this urine is injected into a large-sized guinea-pig, the following symptoms are noted:

1. Increased reflex excitability immediately preceding the convulsive movements.
2. General tonic spasms of all the muscles are followed by clonic spasms, producing a tetanus in which the animal soon dies.
3. Spasms of the respiratory muscles, which cause irregular and gasping respiration, commonly accompany the tonic muscular contraction which precedes the tetanus.
4. Spasmodic contraction of the muscles of the jaw and frothing at the mouth are commonly noted.
5. Involuntary passage of urine usually occurs.
6. During the convulsion the pupils are contracted, and nystagmus is occasionally noted.
7. Death occurs (apparently from asphyxia) in from one to ten minutes after the paraxanthin injection.

cease after a time, and the animal recovers after a period of prolonged stupor.

8. If less than a lethal dose be given, the convulsive movements will

These symptoms very closely resemble the symptoms which characterize the epileptic attacks of *grand mal*, and since they were produced in the guinea-pig by paraxanthin solutions separated from the urines of

patients passed immediately following epileptic convulsions of the *grand mal* type, I do not see how one can avoid the conclusion that paraxanthin is an essential factor in the production of the epileptoid attacks from which these patients suffered.

If it be admitted, therefore, as I think it must be, that paraxanthin is an important factor in the production of one form of toxic epilepsy, then we have a rational explanation of the relation which exists between migraine and epilepsy, since paraxanthin may be the essential cause of both diseases. In conclusion, I again wish to insist that migraine is not closely related to the large group of degenerate epilepsies which I have classified as reflex or developmental, and which are commonly spoken of as idiopathic or hereditary epilepsies, and I would also insist that primary mechanical or focal epilepsy differs widely in its etiology from true migraine. Migraine, therefore, bears a close etiological relationship only to toxic epilepsy, and possibly only to that form of toxic epilepsy which I have designated as paraxanthin epilepsy.

There are many questions concerning the relationship of migraine to toxic epilepsy which cannot at present be answered. For example, we do not know why paraxanthin produces migraine in one individual and epilepsy in another. We do not know why paraxanthin should produce, in the same individual, migraine in early life and epilepsy later. It may be possible that we will find the explanation to these and other questions in certain arterial changes which result in most of these patients from the long-continued irritation of this and other poisons to the bloodvessels, or it may be that other poisons may contribute directly to the production of individual groups of symptoms in different cases. But it matters little, so far as the purposes of this inquiry go, how future investigations may answer these and other questions having a bearing on the exact relationship which exists between paraxanthin poisoning and epilepsy. My purpose here is broadly to claim that the facts which I have offered justify the conclusion that paraxanthin is an essential factor in the production of migraine and also of one form of epilepsy, and that leucomain poisoning (including paraxanthin) is the most important etiological factor common to these two diseases, and that their kinship largely depends upon this relationship.

REVIEWS.

A PRACTICAL TREATISE ON SEXUAL DISORDERS OF THE MALE AND FEMALE.

By ROBERT W. TAYLOR, A.M., M.D., Clinical Professor of Venereal Diseases at the College of Physicians and Surgeons (Columbia College), New York; Surgeon to the Bellevue Hospital and Consulting Surgeon to the City (Charity) Hospital, New York. New York and Philadelphia: Lea Brothers & Co., 1897.

No one can read this book without being impressed with the fact that the work has emanated from the pen of a specialist of ripe experience, fully capable of throwing much light on what has hitherto been obscure. It contains much that is original, together with a great deal of information which cannot fail to add greatly to our rather scanty knowledge of the subjects of which it treats.

The first chapter begins by calling the attention of the reader to a fact not usually appreciated by the general practitioner—that is, to “a thorough understanding of the male sexual disorders,” of which, says the author, “more knowledge is required than is generally supposed.” He goes on to show that these requirements consist in a general knowledge of medicine, an understanding of anatomy, physiology, and pathology of the nervous system; practical experience in diseases of the genito-urinary system, with a familiarity of the anatomy and physiology of the sexual tract; nature and course of syphilis; all acute and chronic infective processes of the genito-urinary tract; together with a knowledge of the use of the microscope, to enable one to make an examination of the urine and the various secretions of the body.

Most of the illustrations are original, and not only add greatly to the interest of the book, but serve to make clear the points which they are intended to elucidate.

The chapter devoted to the consideration of the anatomy, structure, and physiology of the male sexual apparatus is of unusual interest, full of original reflection, differing on some points very materially from the received view of the profession on these subjects. For example, on page 38, we find the statement, following a very conclusive argument, “to my mind the chief function of the seminal vesicles is the elaboration of a peculiar mucus in large quantity, which, in coitus, by its volume and force, carries along with it, without impediment, the seminal fluid which exists in much more sparing quantity in the ampullations of the vasa deferentia.” It has hitherto been believed, and generally taught, that the seminal vessels are the reservoirs of the semen, and that their secretion served the purpose of giving life to the spermatic cell.

The argument offered by Dr. Taylor to support his views regarding the function of the seminal vesicles is not conclusive; but, taken in conjunction with the results of the studies of Dr. George S. Huntington, it would appear that the semen never reaches the seminal vesicles, and

that it is extremely probable that the ideas of the profession hitherto held in reference to the functions of the organs are incorrect.

The explanation offered on page 39 of the change and escape of the seminal secretion in ill health may possibly be correct, and is certainly the most rational that has been offered. The section devoted to the consideration of the ampullations of the vasa deferentia of the ejaculatory ducts is especially worthy of consideration.

Chapters VI. and VII. are given up to the consideration of symptomatic and atonic impotence. They are disappointing, for, while the writer has pointed out the complications which are so frequently associated with these conditions of sexual exhaustion, their consideration is too brief to be practically of service to the profession. When the great frequency of this class of cases is taken into consideration, a feeling of disappointment is experienced that the whole subject has been dismissed so summarily.

It is to be regretted that the writer has not gone more fully into a consideration of the symptoms and of the treatment of these very common and distressing afflictions. It is suggested, too, that an addition of the clinical histories of this variety of sexual disorder would add greatly to the interest of the work, and at the same time prove instructive to the general practitioner.

The article on organic impotence is complete and full of instruction.

A chapter is devoted to new growths and hypertrophies of the vulva, the subject being exhaustively treated; these conditions are familiar to genito-urinary surgeons, but have never been systematically classified nor fully described.

The remainder of the work is devoted to the consideration of sterility, masturbation, sexual excess, spermatorrhœa, sexual worry, hypochondriasis, sexual neurasthenia, conjugal onanism, priapism, sexual erethism, sexual perversion, and sterility in the female.

While the literature of medicine abounds with monographs on hypotrophic ulcerative lesions of the vulva, due to syphilis, lupus, tuberculosis, and chronic ulcerative processes, the text-books contain little, if any, information on these subjects. The portion of the work devoted to the consideration of these conditions may be read by the profession with interest and instruction.

The work is written in the well-known clear and concise style of the author, and is replete with new ideas on the subjects of which it treats. It will fill a long-felt want, and should be studied, not read, by every physician who makes diseases of the sexual organs a specialty.

O. H.

A SYSTEM OF MEDICINE BY MANY WRITERS. Edited by THOMAS CLIFFORD ALLBUTT, M.A., M.D., F.R.C.P., F.R.S., F.L.S., F.S.A. Vol. III., pp. 1176. New York: The Macmillan Company. London: Macmillan & Co., Ltd., 1897.

THIS volume, which treats of infective diseases and toxicology, is the work of thirty-one different writers, who have produced a most valuable addition to medical literature, reflecting great credit on themselves and on the editor. The main divisions are (1) infective diseases of chronic

course; (2) diseases of uncertain bacteriology; (3) infective diseases communicable from animals to man; (4) diseases due to protozoa; (5) intoxications, and (6) internal parasites.

While in general it may be stated that every department is most fully and interestingly considered, certain chapters deserve especial mention.

The chapter on Tuberculosis, by Dr. Sidney Martin, treats fully of the bacteriology of the disease, the lesions produced by the bacillus and the retrogressive changes, gives most interesting details of inoculation and feeding experiments, discusses modes of infection in animals and in man, sources of infection, preventive measures, immunity, etiology, diagnosis, and other considerations.

Dr. P. S. Abraham gives a history of Leprosy, the geographical distribution of the disease, its symptomatology, pathology and bacteriology, its contagiousness, the various considerations bearing upon the question of heredity, and the influence of diet, poverty, race, climate, and segregation. Treatment is considered under three heads: hygienic, medicinal, and surgical. The whole chapter is one which cannot fail to interest the physician and the layman as well.

The chapter on Actinomycosis, by Dr. T. D. Acland, gives evidence of the author's wide reading and complete knowledge of the literature of the subject. Measles and other maladies coming within the category of "children's diseases" are well covered by the several writers, and the same may be said of smallpox and constitutional syphilis.

It would, perhaps, appear somewhat sweeping to assert that the chapters on topical diseases of uncertain bacteriology, such as typhus, dengue, yellow fever, beri-beri, epidemic dropsy, Delhi boil, etc., are individually better than can be found elsewhere in any work of a similar nature; but it may be said, without fear of successful contradiction, that collectively they may, perhaps, be equalled but not surpassed.

Vaccinia is very thoroughly presented in a chapter of 132 pages, by Drs. T. D. Acland and S. M. Copeman and Mr. Ernest Hart. Dr. Acland's connection with the Royal Commission on Vaccination for a period of seven years has given him exceptional opportunity for the clinical study of vaccinia, and Mr. Ernest Hart's lifelong connection with public health matters has abundantly qualified him for a discussion of vaccination as a branch of preventive medicine.

Simply to state that the somewhat brief chapter on Malarial Fever is the work of Dr. William Osler is a sufficient guarantee of the excellent manner in which that subject is handled. Dr. H. A. Laflour writes on Amœbic Dysentery, which has been a subject of some original research by himself in connection with others.

The chapters on Intoxications, covering poisoning by ptomaines, grain, mushrooms, snake-bite, etc., and alcoholism, commend themselves particularly to the sanitarian and therapist.

Dr. Allbutt's chapter on Opium Poisoning and other intoxications is exceptionally interesting and valuable, and his remarks on the treatment of poisoning by opium may well be taken by writers on therapeutics and toxicology as a basis for revision of much that is written on that subject. Occasional flashes of a certain grim humor add more or less to the pleasure of perusal.

Dr. Thomas Oliver's work on metallic and some other forms of poisoning is a valuable contribution to industrial hygiene, though his chemistry is sometimes not beyond criticism.

A hundred pages on Internal Parasites, by Drs. Griffiths, Manson, Guillemard, Vereo and Stirling, complete the volume in a most highly satisfactory manner, presenting the subject very fully and with many instructive illustrations. C. H.

INCOMPATIBILITIES IN PRESCRIPTIONS, FOR STUDENTS IN PHARMACY AND MEDICINE AND PRACTISING PHARMACISTS AND PHYSICIANS. By EDELL A. RUDDIMAN, Ph.M., M.D., Adjunct Professor of Pharmacy and Materia Medica in Vanderbilt University. Pp. iv. 264. New York: John Wiley & Sons, 1897.

THE first part of this volume contains in convenient and condensed form the more common incompatibilities; the second, a list of incompatible prescriptions to the number of three hundred and twenty-five. Following this are explanatory notes which point out the difficulty and give the best means of avoiding or overcoming it. On page 240 is a table showing the effect of rubbing together equal weights of two solids. There are two indexes—one to incompatibilities and the other to prescriptions. That such a book is needed by the physician the prescription-files of any pharmacy would demonstrate, and that the pharmacist could profit from its study the frequent, unnecessarily unsightly bottles sent out from the shops are evidence. In examining five hundred consecutive prescriptions from an excellent pharmacist, written by one hundred and eighteen physicians, we recently found chemical incompatibility in 7.2 and physiological in 6.2 per cent. We all can improve our prescribing by studying this book. How many syphilographers, for instance, are aware that corrosive sublimate is slowly converted into calomel by the compound syrup of sarsaparilla (p. 63), or that milk-sugar when triturated with calomel changes some of it into corrosive sublimate (p. 65)? As to the correctness of the statements contained in the book the author frequently gives his authority and often shows that he has verified the observations of others. We doubt very much, however, if morphine is physiologically incompatible with paraldehyde (p. 78), since respiratory paralysis is a marked feature in poisoning from either. The author is to be congratulated upon his rigid adherence to modern chemical and pharmacopœial nomenclature—a custom more honored in the breach than in the observance. But we prefer alcoholic potassium hydrate (p. 43) to alcoholic potash (p. 46 and elsewhere), and alkaline rather than alkali hydrates. Typographical errors are extremely rare—*pirotexin* (p. 63) is an example. The volume exhibits the result of patient research and long-continued industry, and its appearance should be rewarded by better work by the physician as well as by the pharmacist.

R. W. W.

VADE-MECUM OF OPHTHALMOLOGICAL THERAPEUTICS. By DR. LANDOLDT and DR. GYGAX, of Paris. 16mo., pp. vi. 138. Philadelphia: J. B. Lippincott Company, 1898.

THE statement of the authors that "This work is not a treatise of ophthalmological therapy, nor is it a dictionary," indicates that they feel that their work borders upon both of these.

Its contents are divided into paragraphs arranged according to topics in alphabetical order. This obviates the need of an index, but leads to the necessity of many cross-references and to occasional repetitions. Thus, under the heading "Cornea, foreign body of the," we find it stated, "Where foreign body has penetrated into the tissue of the iris: iridectomy," and practically the same thing under "Iris, trauma of the," while "Foreign body" is not given as a topic.

In most respects the teaching is sound, clear, and as complete as it could possibly be made in the space allotted. The three pages devoted to "Specific Treatment, Antisyphilitic Treatment," for which the authors express their thanks to Prof. Fournier, contain a most admirable résumé of the subject. In regard to the treatment for hyperopia and myopia, however, the attitude seems to be: If the patient must wear glasses, let them give him as little help as he will be at all satisfied with. For hyperopia they say: "For distant vision correct at most but the manifest hyperopia." Only for aphakia do they advise the glass correcting the entire error. Again we quote: "Patient hardly ever tolerates permanently the glass completely correcting this myopia." "It is nearly always better for a myope to use no concave glasses for near vision."

Such an attitude toward these forms of ametropia is responsible for much unnecessary suffering, and, in so far as it is maintained, will place the work of the ophthalmic surgeon below that of the optician who is willing to sell his customer whatever glasses the customer chooses. It is a survival of the fear of correcting lenses, an error prevalent in the profession before the time of Donders, and which exact study of the subject of refraction should ere this have dissipated. Inability to recognize the few defects of this kind may cause the book to do some harm among those not widely read on the subject, but on the whole it will be useful.

It is a work that deserves and will have a wide circulation among general practitioners, and may also be read with great benefit by the specialist. It is neatly printed in convenient form to carry in the pocket, and the arrangement of matter and selection of type are such as to make its contents quickly available to any one. E. J.

A TEXT-BOOK ON MENTAL DISEASES. FOR THE USE OF STUDENTS AND PRACTITIONERS OF MEDICINE. By THEODORE H. KELLOGG, A.M., M.D. New York: William Wood & Co., 1897.

THE work before us is a large volume of seven hundred and fifty-nine pages. The object of the book, as stated in the preface, is "to set forth in a condensed but comprehensive manner the present state of the science of mental diseases. The book is made to embrace the wide range of the history, statistics, nosology, etiology, clinical course, symptomatology, pathology, diagnosis, prognosis, and treatment of mental disorders. An attempt has been made to introduce such clear and systematic subdivisions as would best tend to facilitate the comprehension of the whole subject and render the book available for students and practitioners of medicine. The book aims to be a practical guide to the diagnosis and

treatment of all the various types of insanity with which the physician has to deal in public hospitals or private practice, and also to act as a work of ready reference to psychiatrists in the emergencies of their specialty."

The subject is divided into two parts, the first of which deals with "general mental pathology," and the second "the special groups and typical forms of insanity." Part I. embraces a series of interesting and well-written chapters. Among them are to be specially mentioned one on the Nosology of Insanity and those of Psychical and Somatic Symptomatology. In that on nosology the subject of classification is considered in a very systematic manner.

However, general statements, generalizations, and time-worn platitudes are of little value when compared with the specific statements which should be made regarding the etiology, symptomatology, diagnosis, and treatment of each specific mental affection. In the experience of the writer these general sections in treatises of mental diseases are rarely, if ever, read by the student or by the practitioner. What the student and physician need are systematic statements and elaborate clinical descriptions of the actual diseases with which they meet in daily life. It is, therefore, disappointing to find that while 516 pages are given up to the consideration of merely general matters, only 241 are given to the actual discussion of the various forms of insanity. The conviction forces itself upon the reader that the special and clinical part of the book must have been condensed and much abbreviated in order to admit of the expansion of the almost useless general section. The writer does not desire to imply that the general section is badly written, but merely that it is disproportionately large and contains much matter that has no practical application. In detail our criticism of the chapters is somewhat as follows:

Chapter I., on the History of Insanity, is sufficiently condensed; that on Statistics of Insanity had best been entirely omitted, while that on the Nosology of Insanity is an admirable review of the various forms of classification at present adopted; but the author errs, in the opinion of the writer, in not contenting himself in the present unfortunate state of our knowledge by simply *enumerating* the various forms in which insanity manifests itself. The chapter on the etiology of insanity could have been much condensed, while that on the evolution, stadia, clinical progression and termination of mental disorders could with advantage have been entirely omitted. The chapters on Psychic and Somatic Symptomatology are excellent and deserve unstinted praise, and yet it is an open question whether the student will not gain a clearer conception of the symptomatology of insanity in general by a study of the *symptomatology of the specific forms*. In the opinion of the writer this is the only way in which a knowledge of the symptoms is really acquired, especially as insanity is a disorder a knowledge of which can only be acquired by the actual study of living cases. The generalizations present in the general sections of works on insanity are abstractions of clinical experience, and are not materials fit for presentation to the student or practitioner save to an exceedingly limited degree. The practical value of chapters on the Pathology, Diagnosis, Prognosis, and Treatment of Insanity are also, in the opinion of the writer, equally open to question. Certainly in the consideration of each specific form of mental disease every factor considered in Part I. from a general stand-point

must be considered a second time in the special section, and it is specific statements of facts in relation to specific affections that are of importance. Considered in this light, it is certainly an anomaly that more than two-thirds of the book should be devoted to general considerations and less than one-third to detailed descriptions of the various mental diseases. It is difficult to avoid the inference that as a result of this arrangement the special section has suffered, and an examination of its pages shows this to be the case. The descriptions are for the most part exceedingly condensed. For instance, melancholia is considered in less than six pages; mania in less than eight, while paresis, which is a very world within itself, is disposed of in twenty-two pages—that is, history, etiology, symptomatology, diagnosis, prognosis, and treatment. The other forms of insanity are considered in the like condensed manner.

The author classifies the various forms of insanity into two groups:

Group A “is made in accordance with the etiological and pathological principles, and is, hence, briefly defined as etio-pathological, and as having assignable etiological and pathological relations.” It consists of seven classes: first, insanity from general arrested development; second, insanity emerging from constitutional neuropathic states, usually hereditary, though occasionally acquired; third, insanity with established neuroses; fourth, insanity in connection with the physiological crises; fifth, insanity with general systemic morbid states; sixth, insanity with definite pathological conditions of the encephalo-spinal, vasomotor, or peripheral nervous system, and seventh, insanity from pathological psychic influences.

The second group “consists of the simple psychoses without definitely assignable etiological and pathological relations, and hence the group is briefly named psycho-symptomatological.” It consists of the emotional (Class VIII.), the intellectual (Class IX.), and volitional (Class X.) insanities. In the present unsatisfactory state of our knowledge of insanity, almost any classification can be adopted, and a reviewer could reasonably be charged with being captious if he found fault with the classification adopted by any one author. As a matter of fact, the classification—that is to say, the order in which the subjects are considered—is of a relatively slight importance, the real point of importance being the accuracy, the fulness and completeness of the clinical descriptions. A standard work upon insanity should consist of elaborate and comprehensive word-pictures of the things actually met with in the daily life of the physician in or out of the asylum, and should be interspersed with appropriate records of cases actually studied and observed. This is assuredly not the case in the special section of the work before us.

F. X. D.

THE NORMAL AND PATHOLOGICAL CIRCULATION IN THE CENTRAL NERVOUS SYSTEM. ORIGINAL STUDIES. By WILLIAM BROWNING, Ph.B., M.D. Philadelphia: J. B. Lippincott Co., 1897.

DR. BROWNING'S book is made up chiefly of original papers which have been read before various scientific societies and published in various medical journals. It is, therefore, rather lacking in unity of design and systematic presentation of its subject, and these are defects for which the reader, unfortunately, suffers more or less all the way

through its pages. The author's commendable plan, however, has been to present a series of articles which should embody something original, and, even if he has done this at the sacrifice of a systematic scheme, he may reasonably claim the indulgence of his readers.

The first six articles deal exclusively with anatomical subjects, and are based on some original experimental work. The first paper is on the important subject of the spinal efferents for the cerebro-spinal fluid. Browning concludes that outlets for the cerebro-spinal fluid exist along the lumbar nerves in the lower animals at all ages, but in the human being only during intra-uterine life. This has been shown in the dog and in the human foetus by the deposit in the psoas muscle of material injected into the subarachnoid space. The obliteration of these efferents in the human infant begins, according to the author, at or about birth, and constitutes one of the earliest changes of extra-uterine life. In the place of the spinal efferents the arachnoidal villi, and perhaps the other cranial outlets, increase as life advances, and act as substitutes. With reference to these general conclusions, we may say that the paper does not seem to us to be entirely convincing, and as it deals but little with the cranial efferents its contribution to our knowledge of the circulation of the cerebro-spinal fluid is negative rather than positive. The other anatomical studies in the book have largely to do with the disposition of the veins of the brain, and especially with reference to the theory of the developmental rotation of the brain. In these sections we sadly miss good diagrams, without which anatomical studies of the brain are exceedingly difficult to utilize.

The most important clinical study in Browning's book is that on hydrocephalus. The chapter on Obstructive Hydrocephalus and the mechanical principles on which its development depends is especially noteworthy. The author discusses the various theories that have been offered to account for the increase of fluid. These are (1) the closure of the foramen of Magendie, causing retention of fluid; (2) obstruction of the veins of Galen, causing over-production of fluid; (3) inflammation or irritation of the choroidal villi in the ventricles, such as ependymitis, tubercular meningitis, etc., also causing over-production; (4) abnormally diminished resistance in the cranial walls, in very young, rickety, and syphilitic subjects; and (5) obstruction of the ultimate absorbents in the subarachnoid space. This last cause is considered by the author to be an active one, in accord with his belief that in the very young the cranial absorbents have not yet assumed full physiological importance, and hence may be more readily obstructed than later. Browning reviews the literature to prove that obstruction may also act at the several outlets of the ventricles (foramen of Monro, aqueduct of Sylvius, and foramen of Magendie) and also upon the venous system (veins of Galen, etc.) to cause hydrocephalus. The proof is, of course, conclusive so far as it goes; but it seems to us to fall far short of demonstrating that gross obstructive lesions at these several points are either common or essential in this affection. Again, in cases of obstruction of the outlets of the ventricles, as from gross inflammatory or other lesions, it must often be difficult to determine positively that the venous system also has not been interfered with, and hence the claim for a pure type, dependent alone on interference with the circulation of the cerebro-spinal fluid, must still remain undecided. In the treatment of hydrocephalus the author finds more to hope for from surgical interference than we

can. The operation for opening and draining the fourth ventricle (by trephining the occipital bone, lifting up the cerebellum, and even attempting to clear away obstructions at the foramen of Magendie) seems to us to be a particularly rash procedure, especially in a child that may be suffering with tubercular meningitis or some other form of infectious brain-disorder. Anyhow, our data are rather too limited as yet to permit us to diagnosticate accurately obstructive lesions at the foramen of Magendie (the metapore), and, considering the uncertainty of such a lesion being a frequent factor in hydrocephalus, or even an exclusive factor when it is present, our judgment and our practice should still be conservative in the extreme. The same may be said of Quinke's operation of lumbar puncture. It does not go to the seat of trouble, especially if the obstruction be at any point within the ventricles, and, as in cases of cerebellar tumor, as Browning points out, it may not be unattended with risks.

Other important chapters in Browning's book are on double and symmetrical hemorrhages in the brain, and various types of apoplexy. The final chapter, dealing with the early treatment, based on the differential diagnosis, of hemorrhage, embolism, thrombosis, etc., is a praiseworthy and suggestive paper devoted to the amelioration of a class of cases in which treatment is too often discouraging and even futile. On the whole, we can recommend the book as a thoughtful and scientific, though somewhat desultory, work in a most important field of pathology.

J. H. L.

PATHOLOGIE UND THERAPIE DER MÄNNLICHEN IMPOTENZ. Von DR. VICTOR G. VECKI u. GYURKOVICHKY. Zweite, vollständig umgearbeitete Auflage. Pp. 239. Wien und Leipzig: Urban und Schwarzenberg, 1897.

IMPOTENCE IN THE MALE. Second Edition.

WE have read this volume, which is mostly devoted to the pathology of impotence, with considerable interest. The author has industriously read the extant English, German, French, and Italian literature bearing upon the subject, and apparently has given credence to the greater portion of that read. Naturally, with the exception of a limited number of personal observations here related, we expect a compilation of others' opinions based upon more or less accurately observed facts. The book is plain-spoken, and rather more importance is given to the subject than seems necessary. In his therapeutics the treatment must, of course, depend largely upon the causes of the difficulty, and these have been thoroughly gone over in the pathology. In drug-treatment the author cites remedies usually to enter objection to their use. The main reliance seems to be placed on hydrotherapy, less upon electricity, and little upon hypnotic suggestion. It is scientific in tone, possibly sufficiently popular in style to be dangerous, but on the whole quite satisfactory and readable. The author is modest in his case-reporting. For the physician who wishes to know the literature of the subject this volume will be very acceptable.

R. W. W.

PROGRESS OF MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,

PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL
SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

The Use of Methyl Salicylate for Rheumatism.—DR. GILBERT LASSERE, noting the disagreeable odor to which this drug gives rise when used externally, determined to obtain the remedy so that it could be administered by the mouth. He makes use of the pure synthetic product in the following formula: Methyl salicylate, 1; punch (sweetened), 100; distilled water, 100. Six ounces are taken during the twenty-four hours in tablespoonful doses, and this has been sufficient to relieve the pain in forty cases which were about equally divided between the acute and subacute varieties. Salicyluric acid was found in the urine within two hours from the administration of the drug. It is also eliminated by the skin. The drug appears to be useful also in gout, but since two cases only have been under observation definite statements cannot be made.—*Les Nouveaux Remèdes*, 1897, No. 22, p. 683.

The Treatment of Pernicious Malaria.—DR. CLARENCE J. MANLY produces cinchonism as rapidly as possible, and, since the temperature variations are exceedingly irregular, larger doses are necessary. The stomach can rarely be used, and hypodermatic and intravenous injections (Bacelli's method) are to be considered. The great depression must be combated by strychnine and digitalis. The patient must be sustained by enemata of whiskey, peptonized foods, and broths.—*Therapeutic Gazette*, 1897, No. 12, p. 809.

Indications for the Use of Urotropin.—DR. L. CASPER believes that in renal colic the attacks are cut short, the dull after-pains lessened or abolished, and the recurrence of the attack is postponed. With daily doses of from fifteen to thirty grains, excellent results are obtained in phosphaturia. In nearly every instance the urine became clear, even if it had been opaque for years. In cystitis and pyelitis it acts as a disinfectant of the passages; here

the daily dose of a drachm is necessary. In ammoniacal urine the pus is diminished and the remedy shows a distinct antibacterial action, especially in elderly persons who suffer from chronic suppuration in the pelvis of the kidney; and in the bladder we obtain excellent results. These are the instances in which we fear urinary poisoning. Its bactericidal properties are readily understood when we note that in its decomposition formaldehyde is set free. Since only a part is thus decomposed and the remainder is excreted as urotropin, large doses (as above mentioned) can be safely given.—*Therapeutische Monatshefte*, 1897, No. 52, S. 1338.

[Under our observation a single instance of long-standing ammoniacal cystitis, resulting from prostatic hypertrophy in a patient whose heart and kidneys forbade operation, and an entrance upon catheter life was inadvisable, the use of this remedy in fifteen-grain doses at night gave speedy relief. The improvement has continued with the above dose on alternate nights — R. W. W.]

The Treatment of Chyluria by Ichthyol.—DR. MONCORVO, JR., has made use of various remedies in the treatment of this disease, which is common in the tropics. He mentions iron, astringents, arsenic, quinine, manganese, various vegetable remedies, and hydrotherapy; all these have failed. Recognizing the parasitic origin of the disease, turpentine, enso, naphthol, thymol, methylene-blue, and asapol have been tried. Finally ichthyol, a germicide and astringent, was given in dose from seven gradually increased to thirty grains per day, in pill form. Two instances are reported of its successful use.—*Les Nouveaux Remèdes*, 1897, No. 23, p. 719.

Eucasin.—DR. HUGO WEISS notes the easy absorption, marked nutritive value, and absence of irritation of this food. As a food it is of equal value with casein, but the latter is not readily absorbed and frequently gives rise to intestinal fermentation. For rectal administration this preparation is available. In the hyperemesis of pregnancy nutritive enemata of this substance caused a constant increase of body-weight. Especial attention is called to the fact that it contains no nuclein, so that it does not increase the elimination of uric acid. Control observations upon patients suffering from the uric acid diathesis have shown that this opinion is correct. Frequently there has been noticed an increase in the amount of hæmoglobin in the blood. Since this food contains 95.65 per cent. of readily absorbed albumin, its value is readily apparent.—*Therapeutische Wochenschrift*, 1897, No. 51, S. 1326.

The Treatment of Gonorrhœa in Women.—DR. C. F. MARSHALL points out the incompleteness of vaginal douches, and believes that the only forms of treatment which will reach the upper portion of the vagina and distend the rugæ are (1) applications of lotions, as silver nitrate, through a speculum to the whole of the vaginal surface; (2) plugging of the vagina with wool tampons soaked in medicated fluids; and (3) medicated pessaries, the best of which are the gelatin-glycerin. The silver-nitrate treatment cannot be carried out thoroughly without an anæsthetic, and is very irritating. For the wool-tampon method the best drug is naphthol in 2 per cent. solution in alcohol and glycerin. This, however, is irritating. A glycerin solution of ichthyol

(2 to 5 per cent.) is also good. Borax-glycerin or corrosive mercuric chloride in glycerin (1 to 500) may be used. If the inflammation is too acute a vaginal douche of zinc sulphate, lead acetate, and borax, of each one drachm; glycerin, one ounce; to one pint of water, may be used. For the gelatin-glycerin pessary: iodine 1 to 2 per cent.; ichthyol, 2 to 5; corrosive mercuric chloride, $\frac{1}{2}$ of 1; argonin, 5; lysol, 2; formalin, 2; airol, 10; naphthol, 2 per cent. solutions. The best results have been obtained with iodine and ichthyol. Urethritis is best treated with copaiba and santal. Abscess of Bartholin's gland may be cured by simple incision; but if a cyst has previously existed, it should be excised. Endocervicitis should be treated locally by copper sulphate (1 to 12) applied on a cotton-wrapped probe. If endometritis is severe the uterus should be dilated, curetted, and iodine-phenol applied over the whole surface. Condylomata, if numerous, are treated with a powder composed of copper subacetate, 1; and powdered savine, 3. Large ones may be removed by the Paquelin cautery.—*Treatment*, 1897, No. 18, p. 413.

Physiological Experiments with Intestinal Irrigation.—DR. ROBERT COLEMAN KEMP has carried out laboratory experiments on dogs to determine the effect of continuous intestinal irrigation on the pulse tension, temperature, body and blood, renal secretion, and intestinal absorption. The irrigating fluid consisted of normal salt solution (one drachm of salt to a pint of water). His deductions are as follows: 1. Pulse tension: irrigate at 100°, 101°, 102° F., or even to 103°–104° F., if increase is to be avoided. If moderate increase is not objectionable, a temperature of 105°–108° F. can be employed. If it is desired to rapidly increase it and to stimulate the heart, irrigate with a temperature of 110° F. and increase it steadily to 120° F. This is excellent in shock and allied conditions; before or during severe operation, to prevent shock; and from the commencement of chloroform anaesthesia, to prevent the sudden dilatation of the bloodvessels. Cold is a temporary stimulant, and cold irrigation will for a time markedly increase it; later, it is a depressant, and it falls. Cold should therefore be employed with caution. Clinically, it has been noted that more patients have an idiosyncrasy to cold than to heat. 2. Shock from hemorrhage: irrigate with normal saline solution, 110°–120° F., in this condition. With the double-current method, the patient receives a continuous enema at the desired temperature, and the quantity of the fluid can be absolutely regulated by the operator. 3. Temperature: hot irrigation, 110°–120° F., when prolonged, increases the temperature of the body and blood. The increase of blood temperature is possibly due in part to the contiguity of the solution to the great vessels, as there does not seem to be a proportionate ratio of increase of temperature of the body to that of the blood if due merely to effect on heat-centres. In other words, the influence on the blood temperature seems to be greater in proportion than it does on that of the body. The heated blood would undoubtedly be of value in stimulating the heart, and this shows the further advantage of irrigation at a high temperature in shock and allied conditions. If the patient's temperature is already high, it might be dangerous to irrigate with fluid at a high temperature for fear of increasing the temperature of the patient. Cold irrigation reduces temperature, but is

depressing after twenty to twenty-five minutes. At first, cold acts as a stimulant. Clinically, cold irrigation has been employed with success to aid in the reduction of temperature in the diarrhœas of children and in dysentery. It might be employed in sthenic cases to reduce temperature, if used with caution for five or ten minutes, during which friction of the limbs would be advisable. The temperature at the start should not be below 60°-70° F. In duodenal jaundice cold irrigation (two quarts) and the alternate hot and cold douche (two quarts each) have been beneficial. 4. Renal secretion: in ten minutes irrigation at the higher temperatures, especially 110°-120° F., stimulates the kidneys to secretion by the heat and by the stimulating effect on the circulation, also by the heated blood flowing through the organs. In twenty minutes irrigation at 110°-120° F. causes excretion from the kidneys actually through absorption from the intestines. If possible, if the temperature or pulse tension is not too high, irrigate at the higher temperatures, 110°-120° F. This seems to act in a double way: by the stimulating effect on the circulation and by the heat, and also by absorption of fluid from the intestine. The lower temperatures, 100°-104° F., seem less powerful and to act through absorption. There is some increase of tension, but no increase in secretion of urine could be discovered until twenty minutes had elapsed. The slight increase of tension would not likely account for the renal secretion. If it is desired to increase renal secretion without increasing pulse tension or temperature, irrigate at 100°-104° F., and at 105°-108° F. if moderate increase is not objectionable. Intestinal absorption from the large intestine occurs in twenty minutes. This has an important bearing on self-infection, and shows the value of irrigation in diarrhœas. Clinically, hot saline irrigation is an excellent remedy in acute uræmic suppression or in cases of renal insufficiency. Cold irrigation practically inhibits intestinal absorption, on account of the effect on the circulation at the end of twenty to twenty-five minutes, and therefore should be absolutely contraindicated in renal disease, as well as the use of cold enemata.—*New York Medical Journal*, 1898, No. 1000, p. 141.

The Action of Physostigmine upon Intestinal Movements.—DOTTOR GAETANO TRAVERSA, from careful experiments upon dogs and horses, reaches the following conclusions: 1. Physostigmine not only exaggerates the peristaltic movements, but also causes a violent and generalized contraction of the intestine and, finally, tetanus and contractures. If the contraction predominates in the longitudinal fibres, the intestine becomes wrinkled; if in the circular, it is beaded, ringed, or, if the contraction is violent and diffuse, ribbon-like. 2. The exaggerated movements and general contraction of the intestines cease upon the use of atropine, but they do not occur in atropinized animals. 3. The higher nerve centres have no influence upon the production of these phenomena; neither the vagus, spinal cord, nor abdominal sympathetic ganglia. 4. A loop of intestine detached from the body and kept alive by artificial circulation gives the same reaction to physostigmine as intestines in the living body. 5. The changes in motor activity do not depend upon the modification of the intestinal circulation. 6. A loop of intestine which remains inactive from the diffuse tonic contraction of its walls, brought about by large doses of physostigmine, regains its move-

ments under the influence of atropine when circulating in the blood. The spasm of the muscular wall and the narrowing of the bloodvessels disappear, and the lumen of the bowel becomes larger. 7. Physostigmine produces exaggerated peristalsis and violent and diffuse contractions of the intestine solely by excitation of the peripheral motor apparatus. 8. It is an antagonist to atropine, but it is always one-sided [see 2]. 9. So far as the intestine is concerned, the action of physostigmine is identical in intensity and duration of effect with pilocarpine, not only nosographically, but as well mechanically.—*Il Policlinico*, 1898, No. 1, S. 1.

Treatment of Thermic Fever in Infants.—DR. JOHN ZAHORSKY condemns the ice-bath, since this contracts the peripheral arterioles and markedly increases muscular rigidity. In the milder form, sponging the body with hydrant-water and the administration of more water internally is all that is required. In the severe forms a bath, the temperature of which is not below 60° F., may be used; at the same time friction should be vigorously applied to keep the peripheral arterioles dilated. Stimulants may be given as required. In the hyperpyrexial forms it is well to make the skin intensely red, as by nitroglycerin, friction with towel or hand, or a mustard bath; these increase the peripheral circulation; then even sponging with hydrant-water will rapidly produce the desired result. Spraying cold water on the patient, which mechanically causes relaxation of the arterioles and reflexly acts as a powerful stimulant, has been found to be the most effective treatment. The water should not be too cold. For convulsions and tonic spasms chloroform is important. Free perspiration should be induced as soon as possible. Diuretics act well by assisting the elimination of waste products. Unless this is done the fever will rise again, for this tendency persists for two or three days. The stimulants to be recommended are strophanthus, ammonia, ether, camphor, and alcohol. Nux vomica should not be administered, as it may only be synergist to the toxin. Water should be given as soon as possible and freely administered until convalescence.—*Pediatrics*, 1898, No. 4, p. 143.

Eugenia Jambolana.—MR. NORMAN S. RUDOLF, noting that there are three varieties of jambul growing in the gardens in India, states that the ripe fruit can be eaten in season. At other times the fruit preserved in spirit can be employed. The powdered seed in doses of about five to ten grains three times a day is recommended as a very effective means of administration. A vinegar of a light-pink color can be prepared by exposing the juice of the ripe fruit, contained in porcelain vessels, to the heat of the sun. After the juice has commenced to ferment it is filtered and again set in a warm place for a fortnight, when it is ready for use. It is believed that age increases the efficacy of this vinegar. The best form is either the whole fruit preserved in alcohol, the powdered seed, or a fluid extract of the seeds. The natives believe that the pulp of the dried fruit is almost worthless. Considering the high reputation which jambul has held in the East for centuries, it does not seem as though it has attracted in the West the attention which it deserves. The reason is apparently that utterly worthless lots of seed are exported and find their way into the laboratories of manufacturing chemists

in Europe and America. To obtain the seed fit for use it is necessary that the tree from which it is gathered should be of the right variety of jambul, and that no "wind-falls" or rotten fruit be included. The native physicians believe that this remedy is of the greatest use in the treatment of diabetes, and that there is no necessity to restrict the patient's diet, since this prevents the possibility of the formation [excretion?] of sugar in the urine.—*Bulletin of Pharmacy*, 1898, No. 1, p. 6.

[A recent re-investigation of this drug convinces us of its undoubted value. However, further chemical and physiological study is necessary.—R. W. W.]

The Treatment of Hæmoptysis.—DR. C. Y. BLISS classifies this as follows: 1. Moral management. The alarm should be relieved by the assurance that it is not likely to prove fatal. Rest and quiet should be enjoined. 2. Position and rest. The patient should be left in a recumbent position and his clothing loosened without unduly disturbing him. Auscultation of the breathing over the front of the chest is permissible. If the bleeding has been profuse into one lung, an appropriate change of position may enable him to cough up the blood and avert impending asphyxia. 3. Local applications. Ice to the chest apparently does good and has a soothing effect upon the patient's mind. The writer has not observed that catarrh follows its use. 4. Relief of cough. Unless this is severe it does not need treatment. It may even be beneficial in freeing the lungs from blood. If it is desired to reduce its frequency and severity, morphine hypodermatically is to be preferred. 5. Treatment addressed to the nervous system. In cases of nervous excitement opium in some form is most desirable. 6. The action of the bowels. It is generally, not to say invariably, advisable that the bowels should be opened as soon as possible and be kept freely opened; for, since the abdominal circulation is capable of containing a large part of the total amount of blood, it is not unreasonable to believe that the induction of brisk bowel-action by means of purgatives will cause a large amount of blood to pass into the intestinal vessels, and that this may tend to reduce the tension of the circulation elsewhere. The use of the bedpan should be enjoined, but enemata should be avoided. Probably nothing is better than the immediate administration of five grains of calomel, followed by a saline purgative at an appropriate interval. After this, free action of the bowels may be maintained by adding to the mixture to be given some magnesium sulphate and a carminative, as syrup of ginger, in sufficient quantity to produce two or three watery stools daily. 7. Other medicinal remedies. Objection is made to gallic acid because of its constipating effects and to ergot because, while it contracts the smaller systemic arteries, it has no effect upon those of the lungs, and it may indirectly tend rather to raise the tension of the pulmonary circulation. There is little evidence to show that hamamelis, diluted sulphuric acid, and other astringents of this class, have any definite effect upon the small vessels of the lungs. More, perhaps, may be said for turpentine, the action of which in the hemorrhage of purpura and scurvy is recognized to be of great value. 8. Diet. First in importance is the privation of fluid. If possible, reduce the total intake of fluid to half a pint in twenty-four hours. There is no valid argument for the administration of

ice. A spare, semi-solid diet, such as a little milk pudding, bread and butter, thin sandwiches made with pounded chicken or hard-boiled eggs, which can be increased in quantity or improved in quality, should be employed. Stimulants of all kinds should be forbidden, excepting under especial circumstances.—*The Clinical Journal*, 1898, No. 271, p. 161.

The Treatment of Acute Articular Rheumatism by Intravenous Injections of Sublimate.—DR. GUSTAV SINGER details the process as follows: The arm is left hanging over the edge of the bed, in order to bring the veins into prominence, or a compress above the elbow is employed for this purpose. The skin in the region of the elbow is then disinfected, first by energetic rubbing with soft soap and warm water, next with a $\frac{1}{10}$ per cent. sublimate solution, and lastly with ether and alcohol. A sterilized syringe provided with an asbestos piston is filled with the solution and inserted into the lumen of the vein in the direction of the blood-current and parallel to its course. As soon as the color of the solution in the syringe has indicated that the needle has entered the vein (blood entering reddens the solution), the compress is removed and the injection is slowly made. The point of insertion is covered with the finger, the needle removed, and the opening closed with iodoform-gauze and an appropriate bandage. The solution employed is: corrosive mercuric chloride, 1 or 2; sodium chloride, 1 or 2; distilled water, 10. The dose of sublimate is from $\frac{1}{8}$ to $\frac{1}{3}$ grain. The only difficulty is found in the insertion of the needle into the vein. Sometimes a little blood escapes from the vein under the skin, forming a small but painless sugillation. The injection can be made alternately in each arm. Six to ten injections in the course of treatment, at most, being necessary, it is well to begin near the wrist, and later inject nearer the elbow. If the weaker solution is employed, daily injections are in order; if the stronger, then once in two days is sufficient. The mouth and teeth must be carefully looked after and cleansed. For this purpose potassium chlorate is used as a mouth-wash. Of the eleven patients under observation, one developed diarrhoeal stools, with small amount of blood, and two albuminuria, but casts were not found. The results which were observed from this treatment were: 1. The pains were lessened, and consequently sleep was permitted. 2. Swelling was remarkably diminished in the joints primarily affected, but secondary infection of other joints was not prevented. This is not an argument against the use of this method, for it occurs with others—*e. g.*, the use of salicylates. 3. If the injections are given in the morning, the expected afternoon rise of temperature is postponed for several hours, lessened, or abolished altogether. The indications for this method are: Acute articular rheumatism of infectious initial processes (erysipelas, phlegmon, puerperal affections) or peculiar history (chills, recurring endocarditis, frequent exacerbation, protracted subacute course, metastases) which point toward a pyæmic character. In acute disease, when the salicylates are forbidden, or when the inflammation is localized in single joints, this method is recommended. The contraindications are to be found in very weak individuals, severe renal degeneration, and by onset of severe symptoms of poisoning.—*Centralblatt für die Gesamte Therapie*, 1898, 1 Heft, S. 1.

Globularine and Globularettine.—DR. POUCEL reports that in the forms of arthritis—rhenmatism, gout, gravel, the eutaneous or mucous manifestations, the auto-intoxications, by retention of nitrogenous metabolism producing acceleration or irregularities of the heart, extractive matters producing hyperpyrexia, toxins paralyzing the myocardium—these remedies combined produce a cure or relieve the symptoms with surprising rapidity. Brief histories of eight from the two hundred instances of its use are reported. The dose is about a grain of the former and rather more of the latter substance. If administered as the prasoïde of Heckel the dose is from sixty to ninety drops per day. Clinically, this remedy is a visceral depurative and a cardio-vascular tonic.—*Bulletin Général de Thérapeutique*, 1898, 3e liv., p. 81.

[Globularine is a bitter glucoside found in different species of globularia. Globularettine is a decomposition product of this. These are probably obtained from the *Globularia alypum*, the wild senna of Europe, which grows along the shores of the Mediterranean.—R. W. W.]

The Sterilization of Urethral Instruments with Paraform.—DR. EDWARD MARTIN makes use of a box of wood or metal, or of any comparatively air-tight material, in which the instruments can be laid, with a tray or cage upon which the paraform can be spread so that the vaporization may be fairly rapid. In his experiments thirty grains of the substance were used. For efficient lubricants he makes use of two preparations: (1) purified liquid petrolatum with a small quantity of menthol or oil of cinnamon; or (2) a 33 per cent. boroglycerin preparation.—*The Philadelphia Polyclinic*, 1898, No. 6, p. 60.

Methylene-blue in the Treatment of Acute Gonorrhœa.—DR. ORVILLE HORWITZ has employed the following formula in one hundred and five instances: Methylene-blue, 2; oil of sandalwood, 3; oleo-resin of copaiba, 3 grs.; oil of cinnamon, 1 drop; given in capsules. When this combination is administered the purulent discharge, together with all inflammatory symptoms, usually disappeared within four or five days. He presents the following conclusions: 1. Methylene-blue is a germicide of great value in cases of acute urethritis due to the presence of gonococci. 2. It will not abort the disease, but will materially shorten its duration. 3. It markedly lessens the tendency to complications. 4. It is not to be employed in acute urethritis unless gonococci are present. 5. It should be employed as early as possible. 6. Its action is enhanced and the duration of the disease shortened by combination with copaiba, sandalwood, and salol. 7. Injections and irrigations of potassium permanganate early, and, later, astringent injections have a marked tendency to lessen the duration of the disease. 8. It colors the urine a deep-blue; of this the patient should be informed. 9. It is of no service in non-specific urethritis.—*The Philadelphia Polyclinic*, 1898, No. 8, p. 98.

The Treatment of Syphilis.—DR. RICHARD KOPFER presents a plea for the hypodermatic use of corrosive sublimate in large doses. He makes use of the following formula: corrosive sublimate, 5; sodium chloride, 5; distilled water, 100; and reports the results of 258 injections in 69 hospital

patients, and 240 injections in 58 ambulant patients. The injections are made into the gluteal region a short distance from the anus and avoiding a locality which will interfere with sitting or locomotion. The injections are to be placed deep into the muscles (one and one-half inches), and the entire quantity deposited before withdrawal of the needle, so that none of the solution will get into the track of the needle, because this is painful. The orifice should be closed with iodoform-collodion. Intra-muscular infiltration occurs in about one-fifth of the cases. This may become the size of a bean or a walnut, but rapidly disappears. Abscesses have not occurred. The interval between injections should be from five to eight days.—*Prager medicinische Wochenschrift*, 1898, No. 1, S. 1.

MEDICINE.

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Disturbance of the Choking-reflex, Speech, and Deglutition in Hemiplegia.—W. KATTWINKEL (*Deutsches Archiv für klin. Med.*, Bd. lix. p. 317) has made an investigation under Prof. P. Marie, at the Bicêtre, Paris, for the purpose of finding some anatomical ground for the symptoms named, so important in diseases so various as pseudobulbar paralysis, hemorrhage, infantile cerebral palsy, etc. He examined especially one hundred cases of hemiplegia, fifty right-sided and fifty left-sided. The age of the hemiplegia, its origin, whether apoplectic or gradual, and the extent and duration of disturbances of the functions mentioned above were investigated. The methods of clinical examination require no description. The principal conclusions drawn are: 1. That the centre for word-forming is in Broca's convolution. 2. The centre for co-ordination of speech—articulation—is chiefly in the third right frontal convolution. 3. Both centres are united by association-fibres passing through the corpora striata. 4. The reflex centre for the pharynx and larynx is in the corpus striatum, especially in the right side, where also the deglutition centre lies.

The author found disturbances of speech in forty-one out of fifty cases of left-sided hemiplegia, and in twenty-five of these the disturbance was permanent. They consisted essentially of loss of co-ordination, and are ascribed, in opposition to most writers, to the lesion in the third right frontal convolution, and not to functional alterations of the facial or hypoglossal nerve. A number of the cases are cited, some with autopsies.

Thrombosis of the Portal Vein.—This is an extremely rare condition, but one that can at times be recognized during life. BORRMANN (*Deutsches*

Archiv für klin. Med., Bd. lix. p. 283) has worked up the previously-reported cases and added one of his own. He shows that besides thrombi of the portal vein, due to compression or to the spread of inflammation from the vicinity, there are others, which may be called primary, depending on a local disease—atheroma—and having an etiological relationship, among other things, with syphilis. The clinical picture of this process is often not striking, but may be very characteristic. In the latter case there is a sudden onset with pain and all the signs of an acute stasis in the portal circulation—ascites, vomiting of blood, bloody stools, enlarged spleen. Of diagnostic importance are the condition of the liver, the history, and the suddenness and severity of the symptoms. If there is a complete and sudden obstruction of the portal vein, death ensues; but in other cases canalization of the thrombus and temporary restoration of the lumen permit the patient to live a long time. The consequences of thrombus for the liver are not so important as might be supposed, and consist chiefly of moderate atrophy and interstitial sclerosis. An important sign is rapid recurrence of ascites after puncture.

A New Method in the Radioscopy of the Stomach and Intestines.—I. BOAS and M. LEVY-DORN recommend (*Deutsche med. Wochenschrift*, 1898, No. 2) an ingenious method. Gelatine capsules are filled with metallic bismuth and then covered with celluloid, making them insoluble. To aid recovery from the stools the capsules are colored with a non-poisonous aniline dye. The capsules are 2½ cm. long, 1½ cm. wide, and weigh when full twelve grammes. They are readily swallowed, and in none of the fourteen persons experimented on were any symptoms produced. The capsules are readily seen (in thin persons) with the radioscope; the position in the abdomen may thus be recognized, but the exact part of the alimentary tract can, of course, be determined only within certain limits. Practically, it was not difficult to know when the capsule was in the fundus of the stomach, or in the cæcum, because it remained there longer than in other positions. In the small intestine the progress seemed to be rapid, and when the capsule was found in the left iliac fossa it was evacuated within twenty-four hours, indicating its presence when seen before in the sigmoid flexure.

The capsule usually disappeared from the stomach within twenty-four hours in patients with mild gastric symptoms, and was then found in the cæcum; but in obstruction of the pylorus it remained as long as four or five days in the stomach.

The possibilities of this method of examination are evidently great. The motion of the intestinal tract in health and disease, and under the influence of various drugs, especially those like creosote, alcohol, strychnine, bitters, and cathartics, can be studied with advantage, though, as the authors remark, conclusions as to the motion of the usual ingesta must be drawn with caution.

A Case of Chronic Fibrinous Bronchitis; and the Nature of the Casts in that Disease.—A. HABEL reports a case from Eichhorst's clinic. A woman, aged forty-one years, with long-standing mitral insufficiency and stenosis, expectorated fibrinous casts almost daily for about two weeks. Later

she had an incarcerated hernia, was operated upon and recovered, but developed nephritis and a recurrence of the fibrinous bronchitis. Finally, loss of compensation came on, and the patient died without further fibrinous expectoration. Habel made examinations of the casts in this and another case, also secondary to valvular disease. Stained by Weigert's method, they showed very few fibrin fibres, most of the casts not taking any stain (lithium carmine). Chemical examination also showed the absence of fibrin, but proved that the casts were made up chiefly of mucin. The casts were of acid reaction, and the author thinks this is the cause of the coagulation. According to his view something, probably the action of bacteria, causes the bronchial secretions to become acid. The mucus then coagulates. He applies the same explanation to the casts sometimes expectorated in croupous pneumonia, and was able to confirm his view in a case of the latter disease. —*Centralblatt für inn. Med.*, 1898, No. 1.

The Serum-test for Typhoid Fever at the Montreal Meeting.—The important papers read go to prove that, however great the scientific interest of the serum-test, its results must be used with caution in practice. WIDAL showed, from the extensive statistics of CABOT, that the reaction is present in a very large proportion of cases. He himself only missed it once in 177 cases. He emphasized the difficulty of diagnosing clinically all cases of typhoid fever. In doubtful cases he had made cultures from the spleen. By this method he was able to demonstrate the absence of reaction in a case of genuine typhoid fever with relapse. The examinations were negative during both febrile periods, the intervening stage and the convalescence. Such cases are so rare as hardly to affect the value of serum diagnosis, but prove that the agglutinative reaction has nothing to do with immunity. They follow naturally after observations showing that in some cases the reaction comes on very late. Widal believes the reaction is often more intense in the beginning of the attack. It diminishes and frequently disappears from the first period of convalescence, and is relatively rare in patients who have been cured for more than a year. W. GILMAN THOMPSON described observations showing that the reaction often became more intense as the disease progressed. WILSON and WESBROOK related an interesting case in which there was reaction on the twelfth, nineteenth, twentieth, and twenty-fifth days; absent on the ninth, thirteenth, and twenty-first days, without corresponding variation in the clinical symptoms. These observers examined a large number of cases in children, and found a reaction in 76 out of 165. The reaction appeared earlier than with older cases. (The clinical features in these cases are not mentioned.) In one case a mother seven months pregnant had clinical symptoms of typhoid, though her blood failed to react on the fourth and sixth days. The child was born on the sixth day, and two days later gave a marked reaction. The mother reacted on the thirteenth and twentieth days. E. BATES BLOCK gave some interesting and valuable details on the technique, and advocated the use of serum, rather than dried blood. Thompson held that the value of the test was about the same as that of the diazo-reaction, "confirmatory in connection with appropriate symptoms, but misleading if positive reliance be placed upon it," but MUSSER and SWAN seemed to have had a more fortunate experience. The

latter observers called attention to the fact that the presence of the reaction does not lessen the importance of making an accurate diagnosis of the patient's condition as a whole, illustrating this by the history of a patient who might have been thought to have a relapse, but proved to have a meningitis following the typhoid attack.—*British Medical Journal*, December 18, 1897.

Hæmatoporphyrinuria, with the Report of a Case.—OGDEN (*Boston Medical and Surgical Journal*, February 24, 1898, p. 169) gives a concise historical review of the subject of hæmatoporphyrinuria, and reports a personal observation.

Hæmatoporphyrin is a rare constituent of the urine, and is a coloring matter derived from the blood. The first observations on the subject were made by Hoppe-Seyler in 1871, when he found that hæmatin heated with sulphuric acid yielded a compound whose acid and alkaline solutions showed spectral bands unlike any substance he had seen before. To this new compound he gave the name "hæmatoporphyrin." Nencki and Sieler determined its exact formula to be $C_{16}H_{18}N_2O_3$, and the former demonstrated that the only chemical difference between hæmatin and hæmatoporphyrin was that the latter was simply hæmatin free from iron.

In 1880 MacMunn described a pigment which he obtained from the urine of a case of acute rheumatism, and which he called "urohæmatin." In 1883 he reported other cases of acute rheumatism in which this pigment occurred, and from the similarity of its spectrum to that of hæmatoporphyrin he named the pigment "urohæmatoporphyrin."

Hæmatoporphyrin has been found in the urine in pulmonary tuberculosis, in plenisy with effusion, acute rheumatism, lead-poisoning, and intestinal hemorrhages. The pigment has been found probably most frequently in the urine of patients to whom sulphonal had been administered. In fact, it seems to occur almost constantly when the drug has been given in considerable quantities, but never when only a single dose (one gramme) has been taken. It has also been found in the urine after the administration of trional and tetraol.

Stokvis has found that it occurs after intestinal hemorrhage. In artificial hæmatoporphyrinuria produced in rabbits by the administration of sulphonal, he found that minute hemorrhages into the mucous membrane of the stomach and intestines occurred. From these areas he extracted hæmatoporphyrin, and he believes that in these cases the blood which had entered the digestive tract was changed into hæmatoporphyrinuria, absorbed, and excreted in the urine.

Ogden's case occurred in a woman, aged thirty-eight years, who had suffered from rheumatism for years, and who had a mitral heart lesion. The patient previous to the appearance of the hæmatoporphyrinuria had had diphtheria. During convalescence she began to have vomiting and diarrhoea, and later pains and loss of sensation in the legs and body up to the waist line. Urine and feces were passed involuntarily. On two different occasions trional in fifteen-grain doses was given for insomnia. It was after the administration of this drug that the dark, pigmented urine containing hæmatoporphyrin was voided, and Ogden believes that the drug was responsible for its

occurrence, although he admits the possibility of the disease of the nervous system and the gastro-intestinal disturbance being the causes.

Chronic Diphtheria.—C. MEYER, in a valuable report on the modification of diphtheria during treatment with antitoxin, records two interesting cases (*Deutsches Archiv für klin. Med.*, Bd. lix. p. 465). The first, a boy two years old, was ill a week before admission. Two days before the latter there was hoarseness, and one day dyspnoea and epigastrie retraction. One thousand antitoxin units were injected. On admission there was an extensive grayish-white membrane in the pharynx; the submaxillary lymph glands were enlarged; there were cyanosis, laryngeal stridor, hoarseness, and frequent cough; pulse and respiration accelerated; temperature normal. There was also bronchitis, but no pneumonia. The membrane gave an almost pure culture of diphtheria bacilli. A second injection of 1000 units was made at once, and a third the next day but one. After that the stridor disappeared, but, as the respirations were more frequent, cough worse, and temperature higher, another injection was made. This was followed by a macular eruption. Respiration was still frequent; there were moist râles and cyanosis. Four days later the temperature was 102.5°, and, on account of the progressing disease in the bronchi, another injection was made, followed again by a partly hemorrhagic, partly macular eruption, and a diffuse œdema of the arms and legs. The fever continued another week, when desquamation occurred in large scales. Twenty-five days after admission tracheotomy was performed on account of the marked stridor and the weak respiration over both lungs. Pus from the trachea contained diphtheria bacilli in almost pure culture. A week later the patient died. Autopsy disclosed diphtheritic and streptococcus infections of the lung, in small foci, necrotic in the centres. The author considers the long duration of the disease as an evidence of the specific action of the antitoxin. The passive immunity served to prolong life, but notwithstanding, or, perhaps, because of it, the body could not furnish active immunity for definite recovery. Perhaps also the incidental effects of the remedy in weakening the body contributed to the fatal end, though not the chief cause of death. In the second case, a three-year-old girl had laryngeal stenosis and left-sided pneumonia. Cultures showed diphtheria bacilli. During the first six days two injections of 1500 units each of Behring's serum, and one of 1000 units, were made. Dyspnoea growing worse, tracheotomy was performed. On the following day an eruption appeared, with high fever, lasting nine days. The cannula was then removed; the pulmonary symptoms improved, but fever continued. Membranes were twice expelled. For more than a month bronchitis continued. Frequent cultures always contained Loeffler's bacillus. Three months after the beginning tracheotomy was again necessary, and was followed by bronchitis and pneumonia. An injection of 1000 units was followed by an urticarial rash. Cough and hoarseness were noted occasionally after this at intervals. The bacilli were found in the secretions up to a year and a half after the primary attack, the pharynx showing no abnormality.

Scarlet Fever.—C. SEITZ publishes some interesting data and conclusions, based on observations extending over ten years (*Münch. med. Wochenschrift*,

1898, No. 3). He was unable to find either bacteria or protozoa as primary causes, and looks on streptococci as secondary invaders. The variability of the death-rate, so often mentioned, was very striking, as shown by the extremes of mortality in different years: 2.6 and 15 per cent. Season and weather had no definite influence on the frequency of complications. The local infectiousness of certain houses and rooms, and the family disposition, were often observed, as also the temporary individual disposition, many persons being affected only after several weeks' exposure. As to age, the first year of life showed the smallest morbidity, but the greatest mortality—40.6 per cent. Most cases occurred between the second and fifth years. Out of 833 cases second attacks were twice noted, once after one and once after two years. In the latter the second attack was the more severe. Recidives of the rash were often noted, usually after eight to ten days. Nephritis was not affected by season, nor by the diet, but was dependent on the character of the reigning epidemic. Although the patients lived under practically uniform conditions, the frequency of nephritis varied from 9 to 41 per cent. in different seasons. The greatest proportion happened in the summer, and the complication, sometimes hemorrhagic, sometimes with uræmia, occurred even in children on milk diet and in bed. The author, of course, does not advise neglect of these features. He believes that many cases of so-called intermittent albuminuria and chronic nephritis are due to unrecognized or neglected scarlatinal nephritis. Seitz thinks the angina of scarlet fever is rarely diphtheritic. Out of 800 cases 200 had pharyngeal false membranes, but paralysis followed in only one case. Of 98 cases in which cultures were made, Loeffler's bacillus was numerous in three and scanty in four, in repeated cultures. He, therefore, rejects antitoxin in scarlatinous angina and uses Heubner's injections of 3 per cent. carbolic acid, in the tonsil and soft palate, with cleansing and antiseptic applications by gargle, spray, and swab.

Myoma of the Stomach.—HERHOLD reports an example in a woman of thirty-seven years, with a history of intractable vomiting soon after eating, for three years. Palpation of the abdomen was negative. The stomach was moderately dilated. The vomitus contained free hydrochloric acid, and, although vomiting always occurred soon after meals, not everything eaten was vomited. As there was a history pointing to old peritonitis, it was supposed there was an adhesion pulling on the pylorus. Dietetic and medicinal treatment having failed, laparotomy was performed. In the pyloric region a tumor the size of a hazel-nut was found obstructing the passage into the duodenum to a moderate degree. The tumor proved to be a myoma. Recovery was complete. The author explains the vomiting as due to a reflex, brought on in the neurasthenic patient when the food reached the pyloric region. He could find only two other cases reported in the last ten years. In both the tumors were much larger than in the one now reported, in the case of von Esbach weighing five and one-half kilos.—*Deutsche med. Wochenschrift*, 1898, No. 4.

SURGERY.

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The Food and Digestion after Complete Removal of the Stomach—
Œsophagoenterostomy.—The complete removal of the stomach in man is an operation seldom attempted and more rarely successful as regards the future of the patient. SCHLATTER (*Correspondenzblatt für Schw. Aerzte*, December 1, 1897) reports the following interesting successful operation:

The patient, a female, was fifty-six years of age. She had always had trouble with her stomach from childhood, and, of late, pains and vomiting. Blood and bile were occasionally present. Medicinal treatment was of no avail, and, a tumor being recognized, she was sent to the hospital. She was very thin. Palpation showed a tumor, oval in shape and the size of two fists, occupying the region of the stomach. She was unable to retain any food except milk, and desired operation. There was no free hydrochloric acid.

The exploratory laparotomy showed a hard tumor extending from the pylorus to the cardiac end of the stomach; there were at the pyloric end three soft glands, and the tumor was mobile. Gastroenterostomy was impossible, as the whole stomach was invaded, and the only alternative was the total removal of the stomach.

The stomach was drawn down, the œsophagus seized with a Wölfler's compression-forceps, and the œsophageal end of the stomach with a Stille's forceps, and then resected. Access was obtained to the œsophagus by tearing through the greater and less omentum with Pean's forceps, and ligating with silk. The resection at the pyloric end was done in a like manner. The lymphatic glands were readily removed by blunt dissection. It was found to be impossible to connect the duodenum and œsophagus end to end. The duodenal end was therefore tucked in and closed by a double row of sutures. The duodeno-jejunal fold was then sought, and, when found, it was readily connected to the œsophagus by a lateral and end anastomosis by a series of interrupted silk sutures in the mucosa, and of Lembert sutures in the serous surfaces. The release of the ends allowed the œsophagus to retract, so that the line of union was brought up toward the diaphragmatic œsophageal opening. The abdominal wound was then closed and a dressing applied. A pathological and histological examination of the ends of the tumor showed that the entire stomach had been removed and that there were portions of the œsophagus and duodenum on the tumor-mass removed.

Nutritive enemata were given containing eggs, milk, and brandy. The patient's pulse after operation was 96 and evening temperature 36.4°C . The following day the pulse went up to 142, but the temperature was 37.8°C . The enemata were continued, and during the afternoon tea, with milk, was given per os, and was well borne. The second day the enemata were not retained, and a half glass of Bordeaux was given, a teaspoonful at a time; the temperature rose to 38.1°C . and the pulse to 160, but remained full and strong. The patient had sharp attacks of pain in the region of the stomach. The third day milk, eggs, bouillon, and wine were taken in small doses every two hours, with pepsin and dilute muriatic acid. The pulse was 146 and the highest temperature 38.1°C . On the seventh day the dressings were removed and the wound found to have healed per primam. The first stool was on the fourth day; thereafter, two to three fluid stools. Occasionally there was some milk regurgitated. Ten days after the operation the patient vomited; the diet had become much greater in amount, though administered in small doses.

Twenty days after the operation the patient had for dinner half a chicken, and rested till 4.30 P.M.; she took her usual milk and egg at 6.30; at 7.30 she vomited, with marked contraction of the abdominal muscles, together with considerable choking. There were about 300 c.cm. of fluid, containing the milk, some egg taken an hour before, and some shreds of flesh. After vomiting the patient had a bitter, gally taste in her mouth. On several other occasions the patient vomited. Chemical examination showed the absence of free hydrochloric acid and the presence of lactic acid, with the evidence of the action of trypsin upon the food. Gallic acid and bile pigments were also present. The pepsin and hydrochloric acid were discontinued.

In the first two months after the operation the patient gained about 4400 grammes.

The relation of the stomach to digestion and the bearing upon nutrition, after operation of the total removal of the stomach, the author believes have been shown by this case to be somewhat different from the physiological function usually ascribed to it.

In these cases the disease has so modified the capacity of the stomach and its secretions that it is far from normal, and the system is, as it were, accustomed to doing without it before it is removed. The study of the necessary modification in the diet which the operation required showed the author what the physiological function of the normal stomach was and what loss the system had sustained.

His investigation showed that one of the chief functions of the stomach is that of a reservoir. The food is retained here for a greater or less length of time, according to its digestibility, preventing the intestines from overloading. Extremes of temperature are also corrected, and their harmful action on the intestines prevented. Food was given in small amounts, frequently repeated, and of a character most easily assimilated.

The chemical action of the stomach was at first supplied by pepsin and hydrochloric acid, but the pepsin was useless in the alkaline fluids of the intestine, and the hydrochloric acid was neutralized, so both were discontinued. The action of the stomach on bacteria and in restraining decomposition was

found to be very slight; at least their absence produced no marked change; while the absorption attributed to the stomach is of a very slight degree.

Observations on the relative rapidity of the passage of food through the alimentary tract did not show any marked acceleration, and the chemical analysis of the urine showed no marked alteration.

In this patient the author studied carefully the mechanism of vomiting, and defines it as a complicated act with a number of movements of the muscles of the stomach, œsophagus, the muscles of swallowing, the diaphragm and abdominal muscles. The complicated movements can only arise from a centric source, and these vomiting centres may be stimulated reflexly in a variety of ways.

The gain in weight which the patient showed, which persisted for so long a time after the operation, shows that the stomach is chiefly a protective organ for the intestines and that the intestines, with proper feeding, are capable of entirely replacing the chemical action of the stomach.

On the Immediate Reduction of the Deformity of Pott's Disease of the Spine.—TUBBY (*The Practitioner*, January, 1898), who has performed this operation sixty times, says that it is applicable only to certain cases, and that the following may be regarded as entirely unsuitable: 1. Those cases in which tubercle exists elsewhere. 2. Cases in which much wasting is present there; the pressure of the splint or the plaster-of-Paris jacket, which is used afterward, is apt to give rise to sores. 3. Children who suffer from a cough or other respiratory trouble. 4. Cases in which abscesses are present. 5. Cases in which firm ankylosis has taken place. 6. Cases in which considerable alterations in the shape of the bony framework of the chest have occurred. 7. Patients over twenty years of age are, as a rule, not suitable subjects. 8. Cervical curves are not suitable, for obvious reasons, and in cervico-dorsal curves it is difficult to maintain the reduction on account of the leverage arising from the weight of the head. The size of the curve, provided it is recent, is not necessarily a hindrance, since experience has shown that curves of moderate size yield more readily than small projections.

The cases which are suitable are those in which the disease is recent; in which the angle of curvature is a changing one, the patient is under twenty, the general health fair, and the disease is not so active as to give rise to general constitutional disturbance. Lower dorsal and lumbar curves are, *cæteris paribus*, the most suitable for reduction. *A priori*, the method would seem certain to produce paralysis, but cases that were parietic and paraplegic recovered complete movement and sensation subsequently to the operation.

The author then gives in detail the method of preparing the patient and of performing the operation. He prefers to use a modified double Thomas' hip-splint, with head-rest, rather than the plaster-of-Paris dressing, as it is possible to get at the patient more readily if there is any respiratory complication, and there is not the same danger of producing sores. The patient must be carefully watched out of the anæsthetic. After a few days in the hospital the patient can be sent home, to return once a fortnight for inspection. At the end of two months the splint is removed to ascertain the condition of the parts.

The author does not report the ultimate results in any of the cases treated,

but says: "It appears that in suitable cases this method opens out a good prospect of cure, with a straight spine. And, inasmuch as the method can be carried out with safety, it seems to have a distinct future before it. But the risk is that it may be attempted upon unsuitable cases, and in such an event it can only be that discredit will be thrown upon the procedure."

Contribution to the Surgery of the Bladder.—After remarking on the fact that neoplasms of the bladder exhibit the peculiarity that whether they be simple or malignant they all prove eventually fatal, unless prevented by surgical intervention, CAIRD (*Scottish Medical and Surgical Journal*, December, 1897) calls attention to the progress which has been made in the operative treatment of these tumors. Perineal drainage was a great step in advance in relieving these conditions and checking hemorrhage, and is today one of the safest palliative measures in the majority of deeply-infiltrated tumors. The safety of the high or suprapubic operation has been greatly increased by antiseptic measures and improved methods, while the relief to the patient is as great and the inconvenience less, as, by the latter route, the urine can be retained by a proper device, so that the patient can get about.

The only other alternative is complete removal of the growth in malignant cases, and the cystoscope is the means by which we can decide beforehand whether operation can be undertaken or not, and how extensive it must be.

The amount of involvement and location of the tumor have much to do with the prognosis: does it involve the ureters, one or both? is it extraperitoneal or not? These considerations affect the gravity of the operation. If the tumor can be entirely removed without section of the ureter, the prognosis is less grave, while section of one ureter is less grave than of both. They must necessarily be replanted; then where? In the bladder, if possible; if not, in the rectum. Cases have been reported where such a procedure produced good results.

Traumatic Aneurism of the Ulnar Artery in the Palm Cured by Tying the Ulnar Artery Above the Wrist.—ROBERTSON (*British Medical Journal*, December 4, 1897) reports the case of a fireman who complained of a painful spot just under the hypothenar eminence of the left hand. On comparing the two hands one could plainly detect a bulging at the affected part, and with this bulging a pulsation was very noticeable. He had more than once remarked on the beating. It was, however, the pain that worried him. The swelling was nearly an inch in diameter and almost circular. Firm palpation increased the pain. The patient was healthy, had no syphilitic history, and had never had a day's illness. The traumatic origin was clear, the patient having five months previously given the injector of his engine a firm knock with this hand. This caused a sharp pain in the hypothenar eminence. The swelling and pulsation were first noticed two months ago.

Ligature of the left ulnar completely stopped the beating, the wound healed per primam, and no pulsation has returned. The author believes the extirpation of the aneurism a better operation. Its advantage lies in the fact that the future of such cases need give no anxiety.

Successful Removal of an Enormous Mesenteric Tumor and Nearly Eight Feet of Intestines.—SHEPHERD (*Montreal Medical Journal*, December, 1897) reports the removal of a fibromyxoma weighing thirteen pounds, and with it seven feet and eight inches of intestine. The tumor was one of gradual development and filled the entire abdomen. The operation showed it to be freely movable above, but attached by strong adhesions below. After removing the adhesions and delivering the tumor, it was found to arise from the mesentery and to have attached to it three feet of intestine. It was impossible to enucleate it, and after the mesenteric vessels had been tied the operator found that he must remove more intestine, as its blood-supply had been cut off. The ends of the gut were united by suture, and the patient made a good recovery, although it was necessary to inject salt solution while he was still on the table. The patient gained weight steadily after the operation, and six months later was presented to the medical society in perfect health, having gained twenty-five pounds.

Operation in Intestinal Obstruction.—THOMSON (*Dublin Medical Journal*, December, 1897) says of the typical symptoms of obstruction, pain, vomiting, and constipation, that they do not always form an infallible guide in these cases, and that other elements must enter into our consideration before we can form a definite diagnosis. The surgeon is not usually consulted early enough, not that operation would have perhaps been indicated earlier, for the surgeon is usually as conservative as the practitioner, but that, if operation is necessary, he who becomes the responsible actor should be able to select the most suitable time for his operation. The advisability of operating in every case is not agreed upon by surgeons, but the author's idea of the modern surgical view on this subject is, "because we are in the dark, let us let in the light."

Of the symptoms, he says of vomiting, it is especially valuable, but the quality of the vomit must be considered and the length of time it has continued. Persistent stercoraceous vomiting is an almost positive indication for operation. Pain is of value in locating the trouble within the abdomen, but it rarely indicates the actual site of the obstruction. It has, however, characters of its own. In chronic obstruction it is not severe, and it differs from that of the acute affection, which comes on suddenly and is usually intense. Sometimes there are intervals of quiescence; sometimes the pain may be almost continuous, and the difference seems to depend upon the tightness of a constriction and on whether there still remains any portion of the lumen through which matter may pass.

Temperature is often misleading, and is only to be mentioned to warn against reliance being placed upon it. On the constipation itself we must also not place too much reliance. It depends very much upon the position of the stoppage. If it is high up in the intestine motions may persist for some time, and even diarrhœa may appear for a day or two. If the stoppage is in the large intestine we have the constipation from the outset, although sometimes a loaded rectum below the point may puzzle us by discharging its contents.

Dulness in the flanks is a very unreliable sign. The presence of indican in the urine, and the suppression in proportion to the nearness of the stop-

page to the beginning of the small intestine, are localizing symptoms that are of value.

The general condition of the patient must, however, be considered: the facial expression, and the collapse in some form, which is always present and is sometimes progressive.

These are the series of symptoms, but they are not all present in every case, and skill in diagnosis depends on being able to select the symptoms present and to combine them so that they will lead us aright.

In the vast majority of cases of acute obstruction, to which the author confines himself, there is no room for medical treatment. It is only time lost. Taxis has no attraction whatever for the author. There is no certainty in location of the point affected or of telling how great the destruction of tissue is or what damage is done by the reduction.

We do not conduct the ordinary affairs of life upon the supposition that a miracle is likely to happen; and he supposes that a practitioner who relied on medicine to cure, say a strangulation, would be horrified if it were put to him that that is practically what he is doing. Granted the recognition of the character of the case, there is only one thing to be done, and that is to explore. It is not the opening of the abdomen that kills; it is the fact that that is usually done when, by delay, everything is arrayed against success.

Skiagraphy in Surgery.—In reviewing the progress made in surgery, CARLESS (*The Practitioner*, January, 1898) says of skiagraphy that "fractures are constantly being submitted to examination by its means, and one effect in this direction will be that the general public, which is now able to ascertain without difficulty or much expense whether or not such lesions have been satisfactorily treated, will demand a much more exact correction of the resulting deformities. The patient has the right to demand from the practitioner a perfect restoration of the *status quo ante*, or to know why such cannot be obtained." The author agrees with the suggestion that fractures should be called open and closed rather than compound and simple, and says: "Many a so-called simple fracture is, in reality, much more serious than one called compound, and the patient who recovers from such a lesion may well be dissatisfied with a result which leaves the limb deformed and with its utility considerably limited. One outcome of skiagraphy will certainly be a more frequent resort to operative proceedings." Since the fear of sepsis has been banished there is really no reason why, in careful hands, closed fractures should not be laid open; the risk associated therewith is minimal, the advantage to be gained incalculable. This particularly applies to oblique fractures, whether of the arm or leg, where it is difficult to command the fragments with splints. By this means blood-clot, which, when organized, forms such an obstacle to satisfactory healing, can be removed, while the fragments are wired or pegged together in proper position.

A Case of Typhoidal Cholecystitis with Cholelithiasis.—The case reported by MARTIN (*Montreal Medical Journal*, December, 1897) had the following symptoms: Female, aged thirty-five years; had a temperature of 98½°, pulse 90, respirations 24 per minute. She was poorly nourished, evi-

dently suffered intermittent pain; had grayish-coated tongue, anorexia, and a diarrhoea, with clay-colored stools. There was no jaundice. Examination of the abdomen revealed slight redness over the right hypochondrium and a scarcely perceptible œdema. Pressure on the ribs induced tenderness, but no friction-rub could be felt on palpation. Immediately below the ribs a large mass was detected, continuous with the liver and extending down for as far as 2 to 3 cm. below the umbilicus, situated toward the median line, and its right border slightly external to the right rectus muscle. Percussion over this area produced a modified dullness, with some slight tympany. From above downward the hepatic dullness began at the sixth rib. Pressure behind gave slight tenderness in the right line, but elsewhere there was no evidence of disease. The urine showed a trace of albumin, but no bile. The blood examined in two different laboratories gave the Pfeiffer test for typhoid. The differential diagnosis lay between subcutaneous phlegmon, appendicitis, and infection of the bile-passages as the conditions which could not be readily excluded. The œdema pointed to cellulitis, while some more deeply-seated condition was also probably present. The mass itself could not be definitely defined, except what seemed a tongue coming down from the liver. There was no distinct fluctuation. The symptoms, with the clinical history, pointed rather to some infection of the gall-bladder than to appendicitis. The ultimate diagnosis was that of cholecystitis and cholelithiasis, and operation was urged.

The operation substantiated the diagnosis: a distended gall-bladder was found, from which 150 small faceted stones were removed and a large amount of turbid, grayish-green fluid. The patient did not recover, and died at the end of the second day from the disease. A partial autopsy showed the characteristic lesions of typhoid fever in the intestines and the subacute inflammation of the gall-bladder itself, with the more or less subacute pericholecystitis.

Cultures were obtained at the operation from the gall-bladder, and micro-organisms obtained which responded to all the tests for the *B. typhosus*.

The sudden alteration in the course of the disease, with development of a subnormal temperature and sudden pain in the abdomen, might have suggested perforation of the intestine; but, the pulse remaining quiet and strong, this was practically excluded. The symptoms, too, were intermittent, with periods of comparative freedom from pain and anxiety, which, too, has been a feature prominent in many similar cases of typhoidal cholecystitis. Add to this the tongue of liver pulled down by the gall-bladder, and we have a series of suggestive symptoms for the diagnosis. Jaundice was, of course, not to be expected, as the other bile-passages were free. The condition found shows the necessity for immediate operation in such cases.

Nephrectomy and Nephrolithotomy.—In connection with some highly interesting cases, MYLES (*Edinburgh Medical Journal*, September, 1897) discusses the regional anatomy of the kidneys and shows that the practice of needling is fraught with grave danger. He summarizes his views as follows, giving his objections as:

1. The limited space available for preliminary introduction of the needle into the kidney.

2. The danger of wounding the hollow viscera and inoculating the kidney from them.

3. The danger of wounding the renal vessels, or even the cava.

4. The necessity for many punctures to insure thorough exploration.

5. The difficulty of determining to what depth the needle can be safely thrust.

6. The danger of local necrosis of the kidney.

Of the methods of operating upon the kidney he says there are only two methods worthy of consideration: The intra-abdominal route, the lumbar incision and the conjoint method. He prefers the lumbar incision, for the following reasons:

1. It undoubtedly offers the easiest and safest route to the kidney.

2. Through it the pedicle can be easily secured before any attempt to detach the kidney from its bed.

3. Through it the kidney can be more easily and safely separated from adherent neighboring organs.

4. If the kidney is the seat of a large abscess, such abscess can be readily and safely drained without danger of peritoneal infection, before any attempt is made to deliver the kidney through the wound.

5. In case a calculus should be impacted in the ureter, unless it be below the pelvic brim, it can be more easily dislodged from the loin than from an abdominal opening.

6. The danger of infection from the exposed end of the ureter is avoided by the lumbar incision.

The only valid objection against this method is that a very large kidney cannot be delivered through it.

Against the anterior route he urges the following:

1. The additional danger of peritoneal infection.

2. The difficulty of manipulating the pedicle through a narrow aperture, liable to be blocked at any moment by rebellious coils of intestine.

3. The great difficulty that exists in detaching the kidney, if adherent, at such depth from the surface.

4. The great liability of tearing the thin-walled renal vein in the necessary manipulations.

5. The possibility of wounding the vena cava.

Mixed Tumors of the Soft Palate.—After a study of the pathology, clinical characteristics, evolution, diagnosis, and treatment of these tumors, BERGER (*Rev. de Chir.*, July, 1897) summarizes his views as follows:

Mixed tumors of the soft palate form a well-defined group, having marked anatomical and clinical characteristics.

These tumors have their origin in the glandular structures of the soft palate; their limits are well marked, and remain so, by an envelope of connective tissue which enfolds and isolates them entirely from neighboring tissues.

They justify the name which has been applied to them of epitheliomata of varying structure. Their composition is the following:

(a) Epithelial elements of which the nature is sometimes similar to that of adenomata, sometimes and more often that of epitheliomata.

(b) A connective-tissue web in which are found the various forms of connective tissues, principally that of mucous and cartilaginous tissue. The cases observed by the author are contrary to the theory of an endothelial origin of these tumors.

From the clinical stand-point these tumors are essentially benign; they have never, in the author's experience, presented the progress and termination of true epithelioma. This benignity seems to be due to the strangulation of the epithelial tissue of the tumor by the mucous or cartilaginous structure of the framework.

These mixed tumors of the soft palate are nevertheless difficult to distinguish from sarcomata, which, in this region, may present analogous characteristics—slow development, a very well-marked encapsulement, and a relative benignity.

The gradual growth of these tumors is their sole source of danger, injuring the function of neighboring organs by the compression which they exercise. The prolongations which they send out into the pharynx and the pterygo-maxillary and parotid regions, render their enucleation more difficult. This, however, can be accomplished through the help of the capsule which surrounds them. Recurrences are always due to the incomplete removal.

Other tumors of the soft palate often occur which present a marked analogy to these mixed tumors. But these tumors perforate the palate and invade nasal fossæ and maxillary sinuses.

They are less sharply defined than these tumors of the soft palate. Though some of them apparently arise from the palatine glands, and present the same texture as the mixed tumors, there are others which belong to the sarcomata, particularly the plexiform sarcomata and the angio-sarcomata.

These tumors of the palatine arch must not be confounded with the tumors of the soft palate. Their anatomical study demands new research. The diagnosis of their various forms cannot be established in a precise manner. Their prognosis should be much more reserved than in the mixed tumors.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

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Illumination.—DR. L. LICHTWITZ, of Bordeaux, extols, above all sources of illumination (*Annales des Maladies de l'Oreille, du Larynx, etc.*, 1897), that from acetylene produced automatically, as required, from a generating apparatus. He states that it is so white that the incandescent electric light appears yellow by its side.

Nasal Hydrorrhœa.—MR. CRESSWELL BABER, at the meeting of the Laryngological Society of London, January 12, 1898, reported a case of profuse nasal hydrorrhœa in a lady forty-two years of age, which seems to have been controlled by application of the constant electric current externally on the nose for five minutes twice a day for some three months. The applications were entrusted to the patient herself.

Intranasal Sarcoma.—DR. JAMES E. H. NICHOLS reports (*New York Medical Journal*, January 8, 1898) four cases, in three of which extensive external operations had been practised, and in all had failed to restrain the progress of the growths, though in one instance, a girl of seventeen, life was prolonged for several years.

[It has been the experience of the compiler, that extensive operations are very rarely successful, unless the growth is circumscribed, and that the patient will live longer without operation. It is almost, if not absolutely, impracticable to eradicate the remoter ramifications of the neoplasm; hence sometimes the tumor has grown more rapidly after the operation than it did before, there being no tissue to restrain rapid development.]

Sarcomas in their early stages, when accessible to their outer ramifications, can usually be successfully removed without danger of recurrence. If, as often happens, the cases are mistaken for ordinary polyps or other benignant growths in their early stages, the only chance of cure by radical extirpation is lost, and palliative and systemic treatment is the only alternative.]

Intranasal Angioma.—DR. GLASGOW (*New York Medical Journal*, January 8, 1898) reports a case of angioma in the nasal passage of a lady, twenty-two years of age. The diagnosis was assured by the microscopic examination, which was illustrated. The tumor was eradicated by removal with the cold wire snare, followed by cauterization with chloracetic acid.

So-called False Angioma of the Nose.—In the January number of *Pediatrics*, DR. GEORGE H. GODSON, of New York, reports a case of traumatic angioma of the nasal mucous membrane, the history of which reads like that of a semi-organized blood-clot which subsequently underwent absorption.

Microscopic examination of the growth, as in Dr. Glasgow's case, would have placed the diagnosis beyond doubt.

Trigeminal Neuralgia Relieved by Turbinectomy.—MR. WALTER G. SPENCER showed to the Laryngological Society of London, January 12, 1898, a carpenter, forty-six years of age, who, a few days after an attack of influenza, had been suddenly seized with trigeminal neuralgia, which resisted treatment for some five months. On examination of the left nasal passage, although no definite disease was noticed, a severe paroxysm of the pain and itching occurred when the anterior part of the left middle turbinate was touched. These symptoms were not re-excited after the parts had been coated with a 20 per cent. solution of cocaine. There was no evidence of any other lesion.

The middle turbinate was excised, although it was not in contact with the septum. Nothing abnormal was found in the tissue removed, but from the

time of the removal the patient has had no pain, and has not required a narcotic, although at times there is slight itching at the terminal distributions of the fifth nerve of the face, the back of the eye and the nose.

Hypnotism in Nasal Obstruction.—DR. TAPTAS, of Constantinople, reports (*Revue Hebdomadaire de Laryngologie, d'Otologie, etc.*, January 29, 1898) a case of enlargement of the turbinates which was cured by hypnotic suggestion. The patient was a girl nineteen years of age, who had submitted to total hysterectomy two years previously. She was unable to breathe with her mouth closed for more than three respirations. The doctor advised treatment by cauterization, with subsequent removal of the posterior hypertrophies. Having, however, a few days previously relieved this patient, by hypnotic suggestion, of chronic constipation of several years' duration, he thought he would try what hypnotism would do for this lesion. So he commanded the patient to go to sleep, and to breathe through the nose freely. She obeyed, and continued to be able to breathe freely on coming to. The relief was permanent, notwithstanding she had been unable to breathe through the nose for a year.

[The record of this case should be taken to heart by those who mistake intumescence for hypertrophy and subject their patients to unnecessary mutilation. A purge or a series of purges, attention to the skin and kidneys, will often withdraw excess of blood from the distended turbinates, and save their subjects from unnecessary operation. Even a brisk run up-stairs will sometimes produce a temporary amelioration.]

Empyema of the Frontal Sinus.—MR. ERNEST WAGGETT exhibited to the Laryngological Society of London at its session, January 12, 1898, a patient upon whom he had performed Luc's operation five weeks previously for suppuration of the right frontal sinus of many years' standing. The incision through the skin followed the line of the eyebrow, and the trephining was practised immediately above the superciliary ridge. The sinus was completely cleared of all the mucous membrane which, throughout, was polypoid and bathed with pus. Attention was drawn to the advantages of carefully suturing the periosteum over the perforation made by the trephine, and of removal of the anterior end of the middle turbinate body. The cavity was irrigated by passing a fine flexible tube up through the drain-tube. The latter was removed on the thirteenth day. Pus had not been seen since the operation, and there were no subjective symptoms; depression of the bone could not be detected, and the scar of the skin was unnoticeable.

In the discussion Dr. Herbert Tilley considered the case as a good illustration of the value of incision through the line of the eyebrow, instead of the vertical incision in the middle line, and stated that the case was at least the second or third which had been before the Society in which the value of this incision was very evident.

Suppuration of the Maxillary Sinuses, with its Relation to Chronic Bronchitis.—DR. BRINDEL, of Bordeaux, contributes a paper to the *Revue Hebdomadaire de Laryngologie, d'Otologie, etc.*, February 5, 1898, illustrated by records of cases, and calling attention to the fact that chronic bronchitis

is often an extension from suppuration in the sinuses, and is permanently overcome by curing the original sinusitis.

Foreign Bodies in the Maxillary Sinus.—In a reprint from the *Monatsschrift für Ohrenheilkunde* upon "Foreign Bodies in the Maxillary Sinus," DR. ZIEM, of Danzig, mentions two cases in which he removed canulas which were beyond the reach of forceps, by means of a steel probe, one end of which was slightly bent into a hook. This was placed through the canula, then drawn about 180 degrees around its axis and quickly withdrawn. In one case he succeeded with the first attempt, and in the other at the second attempt.

Dr. Ziem mentions the following additional methods of treatment: Introductions of electric magnet for steel canulæ; division of the alveolar process upon the foreign body with bent scissors; massive injections of fluid into the sinus to drive the foreign body through the nose, as has been successfully practised by Moure and others, and finally direct access by a large opening into the sinus from the canine fossa—a method which should not be practised but as a last resource.

Removal of a "Pressure Pouch" of the Œsophagus.—MR. HENRY T. BUTLIN, of St. Bartholomew's Hospital, reports (*British Medical Journal*, No. 1931) a second case of removal of a pressure pouch of the Œsophagus, his first case having been reported with illustrated collateral material in the *Transactions* of the Royal Medical and Chirurgical Society in 1893.

The case in question was in a gentleman, aged seventy-three years, and supposed to be suffering from stricture of the Œsophagus due to varicose veins in his throat, which veins had been burned and the uvula shortened by a throat specialist in large practice.

A demonstration of the pouch being perfect on examination under anesthesia, the operation was performed at once, a long incision being made on the anterior border of the left sterno-mastoid, with its centre opposite the cricoid cartilage. The dissection was carried down between the trachea and the Œsophagus on the inner side, and the great vessels on the outer side. The superior thyroid artery was tied, the omo-hyoid muscle divided, and the pouch was discovered lying behind the Œsophagus, at its junction with the pharynx and projecting a little toward the left side. It was cut away from above downward, and the edges of the wound were brought together with fine silk sutures. No attempt was made to keep a tube in the Œsophagus for feeding purposes, and a drainage-tube, instead of gauze, was inserted in the wound of the neck. In three weeks the patient was perfectly well, and the wound healed.

The case is illustrated by a drawing of the pouch, and is accompanied with a notice of six cases of the kind seen by Mr. Butlin, who calls attention to the lesion being frequently mistaken for stricture of the Œsophagus, under which impression, as in two cases mentioned, useless gastrotomy has sometimes been performed, the real pathologic condition having been discovered only after the death of the subject.

The return of fragments of undigested food, hours after the meal, is one of the constant diagnostic symptoms.

[All of Mr. Butlin's patients have been men, in whom the symptoms were first noticed after forty years of age, but the present compiler remembers having seen at least one instance in a female subject, the wife of one of his medical friends.]

Pharyngeal Tuberculosis.—RETHI (*Annales des Maladies de l'Oreille, du Larynx, etc.*, October, 1897) records a case in a young man, aged twenty-three years, who had been suddenly seized six weeks previously with violent dysphagia and pains in the left side of the neck, extending to the left ear. The disease had commenced in the left wall of the pharynx and presented an extensive ulceration reaching nearly to the orifice of the Eustachian tube, touching posteriorly the inferior portion of the tonsils and the posterior surface of the soft palate.

The case was not looked upon as promising much scope for treatment.

OTOLOGY.

UNDER THE CHARGE OF

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Treatment of Attico-Mastoid Suppurations and Consecutive Intracranial Affections.—R. BOTEX (*Annales des Mal. de l'Oreille*, vol. xxiii., No. 11), after a careful discussion of the symptoms and indications in the above-named lesions of the ear and cranial cavity, formulates the following rules of action:

1. In acute antro-mastoiditis open the mastoid after the method of Schwartze.
2. In chronic affections expose the antrum and drum-cavity.
3. If the lesions are deep and the auditory canal wide, attico-antrectomy should be performed.
4. If the lesions are extensive and peripheral, antero-atticotomy (Stacke) should be performed.
5. Rapid intervention at the first symptoms of cerebral complication.
6. Never open the dura mater if it is not affected, but, after having carefully disinfected the meningeal surface, explore the nervous centres with a trocar and cannula, 2 mm. in diameter, in order to prevent occlusion of the cannula with a fragment of cerebral substance.
7. Make a perforation in the upper or the posterior wall of the antrum, after having opened the mastoid and the tympanum, in order to penetrate the cranial cavity (Wheeler and Broca), *but combine this with a perforation of the temporal bone at the lowest part of the squama, by making an opening a centimetre wide on the upper edge of the bony meatus, the former opening not being allowed to extend more than a centimetre in width*, for exploration of the middle cerebral fossa.
8. If the affection is very grave an exploratory puncture may be made through the lowest part of the squama.
9. No lavage; dressings every twenty-four or forty-eight hours, and filling the cavity with a bunch of very narrow rubber tubes.

Treatment of Otitic Complications.—HEIMAN (*Annales des Mal. de l'Oreille*, vol. xxiii., No. 2) has formed the following conclusions regarding the treatment of the serious complications of purulent otitis media: 1. The vital complications of otorrhœa still suffer from many wants in diagnosis and treatment. 2. In purulent otitis media, if there is no retention of pus, and yet general symptoms exist, like fever, debility, etc., or local lesions in the cerebrum, opening the cranial cavity is indicated in addition to the perforation of the mastoid. 3. Opening the cranial cavity is indicated even in the cases in which the surgeon does not find there the morbid products he expects to discover; furthermore, this operation diminishes the intracranial pressure as well as the conditions favoring the absorption of infectious elements. 4. When one suspects the existence of a thrombus in the lateral sinus, it becomes necessary to puncture and aspirate the contents of the sinus, after opening the skull cavity. This latter part of the operation is of very great importance in diagnosis, and decides in most cases the necessity of continuing the operation on the sinus. 5. Exploratory puncture and even incision of the sinus will not entail general infection if the operation is surrounded with aseptic precautions, and it is not, furthermore, injurious when infectious conditions already exist. 6. Clinically it is necessary to make a distinction between two forms of pyohemia, viz., that with thrombus and that without thrombosis of the sinus. For operative procedure, pyohemia with thrombus of the lateral sinus offers the most important consideration. 7. Thrombotic pyohemia arises usually from pyohemia without thrombosis. The two forms occur if the infectious sources in the organ of hearing, and especially those in the cranial cavity, are not removed promptly, and the absorption of these matters suppressed. The development of the two forms of pyohemia often dates from the moment when the absorption of the infectious masses begins. 8. Pyohemia without thrombosis generally terminates favorably under the application of a rational therapeutics, and sometimes even without treatment. 9. Pyohemia with thrombus generally ends in death. Prompt and efficient operative interference, however, saves a certain number of cases. 10. The selection of the time of operating in vital complications of purulent otitis, especially when symptoms of general infection arise, is often difficult. When the surgeon dare wait without disadvantage to the patient, it is better not to operate until he is assured in his diagnosis.

[Most of the latest authorities agree in their opinion that it is better to explore in order to confirm the diagnosis of the presence of a suspected intracranial lesion than to wait for symptoms to confirm the diagnosis, when it will be generally too late for any operation to do any good.]

Eucaine as a Local Anæsthetic in the Ear.—HORNE and YEARSLEY have formulated their experiences with eucaine hydrochloride in relation to the surgery of the throat, nose, and ear (*British Medical Journal*, No. 1926). The strengths of the solutions used were 2, 5, and 8 per cent., applied by instillation in the ear, swabbing in the throat, and on pledgets of cotton-wool in the nose. The anæsthesia was found as efficient as that of cocaine. In three cases out of thirty-two unpleasant after-effects were noticed; but "these could be fully explained by other factors present." The effects upon the pulse appeared to be *nil* or very slight. These observers found that instead of

hyperæmia of the turbinates, this drug produced ischæmia of these parts, but not ischæmia comparable to that of cocaine. In the ear it seems to have acted as well as cocaine, but no better.

Goutiness in its Relations to Ear Diseases.—A. H. BUCK starts out with the "premise that a patch of eczema, of spontaneous development, signifies the existence, in the individual possessing it, of a gouty diathesis." . . . "As it happens, the floor of the external auditory canal is apt to be the very first spot on the surface of the body where an eczematous inflammation develops." This condition the author claims "constitutes a valuable guide-post, pointing as it does, at a very early stage, to the existence of that disturbed state of the metabolic processes to which the term goutiness, or a gouty diathesis, is applied." In the cases related it is shown "how different localities or different tissues are involved at different times." At one time "it is the skin of the external auditory canal and auricle; at another time, the dermoid surface of the tympanic membrane is involved, as well as the walls of the canal; at still another, the adjacent bone tissue is affected; and, finally, at a fourth, the disease locates itself in the mucous membrane of the tympanic cavity, and particularly in that part of it which borders upon the two fenestræ." The treatment applied to these lesions, as set forth minutely in the notes of the cases appended to the paper, consisted largely in local applications to the diseased territories in the ears, with combination in some cases of Carlsbad salts. More or less relief was given in this way; but if patients are of irregular habits of living, which they will not give up, relapses in ear-lesions must occur.—*Transactions of the American Otological Society*, vol. vi., Part IV.

Ear-complications in Influenza.—EAGLETON claims that cases of catarrhal otitis complicating influenza, and going on finally to suppuration, may present one of three conditions, that "are probably due to the influence of the presence of Pfeiffer's bacillus:" 1. "Distinctive types of hemorrhagic otitis." 2. "Primary mastoiditis or periostitis before involvement of the middle ear, due apparently to direct infection by the bacillus, and not to extension from the nasopharynx." 3. "Rapid caries and necrosis of ossicles or mastoid, this last being of very frequent occurrence." He also thinks that "the presence of the influenza bacillus exerts a very unfavorable influence on the bony structures of the ear, often converting apparently simple cases of acute suppurative otitis into very malignant ones, with rapid destruction of bone," not only in the drum-cavity, but in the mastoid.—*Transactions of the American Otological Society*, vol. vi., Part IV.

[We have never observed any specific tendency toward virulency nor malignancy in otitis media occurring in epidemic influenza. The course of otitis media in this disease, as in all others, depends upon the judicious, non-irritative treatment of the primary inflammation in the nose and ear.]

Phosphorus Necrosis of the Temporal Bone.—This rare disease has been observed in one instance and reported by H. V. WÜRDEMANN. The patient was a man, aged fifty-eight years, employed in a match factory. Two years after the development of phosphorus necrosis of the upper jaw on the left side the left mastoid began to be painful, and, finally, about a year later,

pain in the ear was felt in addition to the mastoid pain, and finally the ear discharged some foul muco-pus. The membrana flaccida was found perforated. For the necrosis about the mastoid and the chronic purulency in the attic region, antrectomy was performed by Würdemann, and relief followed for five months. Then another operation on the mastoid and antrum was performed, and relief for nearly a year ensued, when again the ear demanded an operation on the mastoid. "The mastoid was chiselled and drilled open, the external layer being found hard and cancellous, under which there was found a pasty mass of necrosed bone from which exuded greenish, fetid pus. The posterior wall of the canal was soft and friable and readily removed by the spoon. It was found that the superior wall had been largely reproduced, and thereupon the triangular piece of bone between the attic and the tympanum was removed and granulations taken away from the tympanic attic." Immediately after this last operation the wound, after the second dressing, was free from pus.—*British Medical Journal*, No. 1926.

Symptoms Demanding Operation on the Mastoid.—BACON looks upon elevation of temperature, though slight, combined with tenderness on pressure over the mastoid process, in a case of acute otitis media of ten days' standing, as characteristic of mastoid disease. "Pressure should always be made on both mastoids, however, as occasionally such pressure causes pain in a healthy mastoid." . . . "Bulging of Shrapnell's membrane, with drooping of the posterior and upper cutaneous lining of the external meatus, are to my mind absolute symptoms of mastoid involvement, and I believe that in such it is always necessary to perforate the mastoid cells." If mastoid symptoms, pain, etc., in connection with chronic purulent otitis media, do not yield to local and general antiphlogistic remedies, there should be no hesitation in making an exploratory opening in the mastoid, when we shall generally find quite as much if not more disease than we had expected.—*Transactions of the American Otological Society*, vol. vi., Part IV.

Anatomical Points Bearing on Operations on the Temporal Bone.—H. L. MORSE has shown that in Schwartze's operation on the mastoid, antrum, and middle ear there is less likelihood of wounding the lateral sinus, the facial nerve, the tendon of the stapedius muscles, the stapes, and the horizontal semicircular canal than there is in Stacke's operation in the same region, because in the latter procedure the field of operation, especially at the beginning, lies nearer these delicate structures than it does in the Schwartze operation. The latter is therefore preferable whenever it can be employed. However, in cases of sclerosis of the mastoid, or where the lateral sinus projects so far forward as to lie just beneath the mastoid cortex, the Stacke operation or a similar one, such as Hartmann's, Küster's, or von Bergmann's, is preferable, because they proceed at once further forward and nearer the seat of disease, even if they possess the disadvantage of a limited field of operation among delicate tissues.—*British Medical Journal*, No. 1926.

Perisinus Abscess with Thrombosis of the Lateral Sinus.—ALDERTON reports a case of perisinus abscess with thrombosis of the lateral sinus

After opening the mastoid cavity and attempting to reach the antrum he came immediately upon the sigmoid groove for the lateral sinus. Pus welled up through the opening thus made, the pus having dissected away the sinus from the bony wall. "As the sinus lay in the tract usually followed to reach the antrum, as the sinus pulsated, and as it was thought that perhaps outlet given to the pus might be all that was needed, it was decided to wait twenty-four hours and watch the progress of the case before proceeding further."

The next day it was decided to open the sinus. This was found to contain "puriform fluid composed of broken-down clot. The sinus wall was then cleansed of infectious material, and with the probe and eurette the clot was dislodged, both above and below, until free hemorrhage was induced." The antrum was not entered at this time. The patient developed metastatic pneumonia, and died six days later. In reviewing the case, Dr. Alderton says: "This case emphasizes the necessity of gaining access, however difficult, to the antrum in all cases of mastoid, sinus, or brain involvement. It does not do to trust to nature after having given exit to the pus. If the antrum had been opened by dissection away the posterior-superior wall of the external canal and the adjacent bone, this patient would undoubtedly have been in a better position for recovery. To the writer it also seems to emphasize the desirability of ligating the internal jugular in the neck in all cases of septic thrombosis of the lateral sinus, to prevent the extension of sepsis."—*Transactions of the American Otological Society*, vol. vi., Part IV.

OBSTETRICS.

UNDER THE CHARGE OF

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Posterior Rotation of the Occiput.—MOTTA (*Archiv für Gynäkologie*, 1879, Band liv., Heft 3) reports eighty-three cases from the Dresden clinic, and draws conclusions from them.

As regards the cause of this abnormality, he is inclined to believe that the form of the uterus, the direction of its axis, and the direction in which uterine contractions act exert the greatest influence. Of his eighty-three cases thirty-nine were primiparæ and forty-four multiparæ. In eighty-one of these cases some abnormality in the shape of the pelvis existed, the pelvis being contracted. Early rupture of the membranes favored this abnormal rotation, as 48 per cent. of his cases had the waters break prematurely. This fact and the abnormal size of the pelvis lead to the conclusion that a disproportion between the fetal head and the pelvis is the primary cause of the abnormal rotation.

As regards treatment, attention is drawn to the difficulty often experienced in the early application of forceps. On the other hand, expectant treatment is attended with considerable risk to mother and child. Motta's cases were treated by version in thirty-three; craniotomy in twenty-eight; the forceps in five; Cæsarean section in four; and symphyseotomy in one; while twelve terminated spontaneously. Of the children, thirty-nine were born living. All the mothers recovered. Motta advises the careful preservation of the bag of waters, and the use of elastic dilators if necessary. When delay cannot be practised, version should be performed if the head has not engaged. When dilatation is not complete and the membranes have ruptured early, the safest method of delivery in many cases will be found in Cæsarean section. The use of forceps will occasionally succeed if combined with Walcher's position.

[In the paper just cited the author has overlooked the considerable proportion of cases in which the occiput rotates in front without interference. Two groups of cases, aggregating over six hundred, may be found in the literature of the subject, in which 98 per cent. resulted in spontaneous anterior rotation of the occiput.]

Synchytioma Malignum.—GEBHARD reports, in the *Zeitschrift für Geburtshilfe und Gynäkologie*, 1897, Band xxxvii., Heft 3, two cases of this form of tumor, and describes the growth in detail. His first patient was a multipara who was seized with bleeding seven weeks after her last confinement. The uterus was as large as a fetal head, and its interior contained a soft, irregular growth. The uterus was removed through the vagina, and examination of the tumor showed it to be derived from the decidua, and malignant in its tendency.

The second case was also a multipara who had suffered from pain in the back and abdomen, with irregular bleeding, for two weeks. On examination a mole was found and removed, the patient making a good recovery. As hemorrhage recurred, a curetting was done for diagnosis, and a malignant synechial tumor was found to be present. The uterus was removed through the vagina. Both of these patients made good recoveries.

Microscopic examination of each case gave the characteristic appearance. He also describes a third case in which a tumor of the vaginal wall was present, which was removed, the patient subsequently perishing. Post-mortem examination revealed multiple metastases, the original growth having been malignant.

A careful study of the third case leads the writer to class it as a synechytioma.

He also describes a carcinoma whose cells took on the same peculiar and irregular wandering growth which is peculiar to synechytioma. It is evident that a most careful examination is required to make a positive diagnosis between the two.

Incision of the Fundus in Cæsarean Section.—In the *Centralblatt für Gynäkologie*, 1898, No. 9, MÜLLER states that he has, in a number of cases, incised the uterus, not across its fundus, but at the fundus in its long axis. He has met with little hemorrhage. The child could be rapidly extracted, and the uterus is easily closed by various layers of continuous catgut sutures.

He leaves his stitches within the uterus, having no hesitation in sewing through the uterine decidua. He thinks that hemorrhage is much less likely after this proceeding. He has employed this method of operation for six years, with excellent results.

Fifty-one Cases of Placenta Prævia.—JARDINE (*Glasgow Medical Journal*, 1898, No. 1) describes in detail a series of cases of hemorrhage from placenta prævia. Among others he cites an interesting case in which De Ribes' bag burst while in use. The fluid separated the placenta and brought about a fatal hemorrhage. The most successful treatment in these cases is delivery performed as promptly as possible.

Extra-uterine Gestation.—In the *British Medical Journal*, 1898, No. 1935, MAYO ROBSON reports seventeen cases of extra-uterine gestation, and draws some conclusions from them.

As regards diagnosis, there was no difficulty in the acute cases. Special symptoms of value were a superficial dulness on percussion over the pubes and in either flank, with resonance on deeper percussion. Also a thrill in the same region, although fluctuation could not be felt. On turning the patient over, dulness in the upper flank persisted for some time, but gradually disappeared, a sign only present when blood is in the peritoneal cavity. Dysmenorrhœa and pain are often present. In old cases a painful tumor near the uterus, metrorrhagia, and the passage of membrane are important symptoms.

As regards treatment, there is no safety except in operation.

Malignant Disease in Pregnancy.—In the *Scottish Medical and Surgical Journal*, 1898, No. 2, FOTHERGILL reports the case of a woman, aged thirty years, who died of a malignant pelvic growth. There were no metastases. The growth was composed of alveoli separated by bands of fibrous tissue. It was a malignant adenoma arising from the glands of the cervix during pregnancy. He describes also a case in which a foreign growth involved the labia and also the pelvic organs. This was found to be a round-celled sarcoma. The history given by the patient was that she was well until her last confinement, when she first noticed an offensive discharge. On further investigation, the physician who delivered her stated that at labor malignant disease was so far advanced that it was necessary to deliver by craniotomy and afterward sew up the cervix.

A third case is described in which tissue removed from the uterus proved to be round-celled sarcoma resembling very closely a syneytioma, occurring in a uterus which was fibroid.

In each of these cases it would have been easy to arrive at the conclusion that these tumors were syneytial and directly derived from the uterine decidua. Fothergill urges that the greatest care be taken in diagnosis, that errors may be avoided.

Pulmonary Congestion and Œdema During Pregnancy and Labor.—DUPONT (*Gazette Hebdomadaire*, 1898, No. 9) reports three cases of cardiac disease in pregnancy and labor, accompanied by acute engorgement and œdema

of the lungs. He concludes, from a study of these cases and a review of the literature, that acute congestion may complicate pregnancy and labor independently or in connection with cardiac disorders. When acute pulmonary œdema occurs alone, labor does not aggravate it, and increases the work of the heart but very little. Both heart and lung failure, however, may develop rapidly after the labor. Rupture of the utero-placental circulation aggravates the œdema, as does the evacuation of the uterus, the hemorrhage of labor, and the suppression of the utero-placental circulation which throws the heart into a condition of asystole. The acute congestion occurring during labor seems due to a reflex of uterine origin and to a modification of the blood during pregnancy. To avoid such complications, when the heart is threatened with asystolic failure, or when acute œdema suddenly develops, labor should be immediately brought on. The bleeding which often occurs in labor is an advantage in these cases.

Antitoxin in Puerperal Sepsis.—CLARK (*Boston Medical and Surgical Journal*, 1898, No. 2) reports two cases of puerperal sepsis treated by antitoxin.

The first was a multipara who had pelvic trouble after a former labor. Her labor was normal. She developed high fever, with soft and flabby uterus. The usual treatment of septic infection proving ineffectual, and septic absorption proceeding, 20 c.c. of antistreptococcus serum were injected. Immediate improvement followed. The dose was repeated, and convalescence ensued.

The second case was a multipara who had an easy labor. She developed diphtheritic infection of the genital tract, cultures from the vagina showing Klebs-Löffler bacilli and staphylococci. Double antidiphtheritic and antistreptococcic serum was given in dose of 40 c.c., which was repeated on the following day. Local disinfection of the uterus was continued. The patient made a tedious recovery.

In both these cases local disinfection, free purgation, and stimulation were ineffectual, and the use of serum was followed by prompt improvement.

Heart Disease and Pregnancy.—PINARD, in a clinical lecture (*Medical Press*, 1898, No. 3065), described two cases of valvular heart disease in pregnant women, and drew the following practical conclusions: Pregnancy of itself does not provoke heart lesions. In women who have cardiac disease and become pregnant, if the kidneys are sound, compensation is established.

The treatment of these cases is exceedingly simple—absolute rest, milk-diet after the fourth month, and digitalis in infusion at intervals. Should syncope and complications arise, empty the uterus promptly and bleed.

GYNECOLOGY.

UNDER THE CHARGE OF

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Operations for Prolapsus Uteri.—SANGER (*Centralblatt für Gynäkologie*, 1898, No. 2) in an elaborate paper on this subject describes an operation which he has practised with success. A suture is introduced just behind the portio in the median line of the posterior vaginal wall. After thorough dilatation of the sphincter ani, the left forefinger (protected with a rubber cot) is introduced into the anus and inverts the recto-vaginal septum as much as possible. A vertical incision is made in the posterior vaginal wall with a scalpel, and crescentic, or V-shaped, flaps are dissected off from its lower end with scissors, their size varying with the amount of redundant tissue. While these flaps are held apart with forceps, the upper edges of the wound are detached in the same manner. When the peritoneum is reached, it is carefully pushed upward with the finger or a gauze-pad; the rectum is separated with the same care. The edges of the levator ani are also detached as low down as the vulva.

The flaps are now cut away, bleeding vessels being caught with forceps. The denuded surface resembles that made in Hegar's operation, except that it extends higher and also approaches nearer to the anus, and extends laterally into the para-vaginal connective tissue. The upper sutures (silk) are passed in the usual manner, buried catgut being used if there is an extensive rectocele. Toward the lower end of the wound the vaginal edges alone are included in the sutures. The results of this operation, when properly performed, have been entirely satisfactory.

Does Cauterization Prevent Infection?—BRINK (*Ibid.*) endeavors to answer this question by experiments on animals. Guinea-pigs were etherized, the abdomen opened, and an eschar made on the peritoneum with a glowing platinum wire. Without disturbing the wound, it was touched with another wire dipped in a staphylococcus culture. The wound was then closed and sealed with iodoform-collodion. Two days later the animals were killed, the abdomen excised with a cautery-knife, and the eschar removed with aseptic precautions. In all the cultures made from the tissue immediately beneath the lesion colonies of staphylococcus aureus were obtained, which were inoculated with the usual results. In animals killed from six to ten days after the primary inoculation the micro-organisms were found in the deeper tissues.

The writer infers not only that an eschar does not prevent the penetration of pathogenic organisms into the subjacent tissue, but that it probably fails to prevent re-infection of raw surfaces during operations for cancer. Hence the results claimed for igni-extirpation of the cancerous uterus are open to considerable doubt.

Cystitis of Infectious Origin.—KARGER (abstract of monograph in *Centralblatt für Gynäkologie*, 1898, No. 2), from a careful analysis of forty-six cases, arrives at the conclusion that cystitis (with certain rare exceptions of chemical or toxic origin) is always due to micro-organisms, the bacterium coli commune being the most common. The mucosa of the bladder, however, must previously be in a condition favorable to infection. The existence of so-called "catarrhal cystitis" is doubtful. Ammonuria is of secondary importance; in the majority of cases the reaction is acid. True gonorrhœal inflammation of the bladder is always caused by Neisser's cocci.

The prevention of cystitis lies in the maintenance of absolute asepsis of the meatus urinarius, as well as of the urethra. A four per cent. solution of nitrate of silver is the best remedy in inflammation of the bladder.

Prolapse of the Bladder in the Female.—KLEINWÄCHTER (*Zeitschrift für Geb. u. Gynäkologie*, Band xxxiv., Heft 2) has collected only eighteen cases from the literature, to which he adds another. Nine occurred in children, eight cases being those of complete prolapse through the urethra. The accident occurred suddenly, in consequence of violent abdominal pressure, or gradually. The diagnosis is not usually difficult.

The treatment consists in replacing the inverted organ under anesthesia, after which pressure is maintained against the neck of the bladder by means of tampons, the patient being kept perfectly quiet for several days. In adults the catheter should be used regularly. In the latter a pessary may later be substituted for the tampon, or, if this fails to prevent a recurrence of the prolapse, ventro-fixation of the bladder may be practised. Of the cases reported, eleven patients recovered without an operation; four of the others died, two of uræmia.

Therapeutic Effect of Mechanical Irritation of the Uterus.—REINECKE (*Münchener med. Wochenschrift*, 1892, No. 52) believes that one of the most valuable results of massage of the uterus is the causing of contractions, with resulting changes in its shape and size. As Arendt has shown, in many cases of retroflexion without fixation, reposition is rendered difficult purely on account of the size of the uterus. Massage at the point of flexion, with one finger in the rectum and the other in the vagina, produces contractions, in consequence of which the isthmus hardens and the corpus uteri is felt to rise perceptibly. If this treatment is continued, reposition can easily be effected. Subinvolution and venous congestion are also greatly relieved by this method of massage.

Atrophy of the Uterus Following the Introduction of Steam.—BARUCH (*Centralblatt für Gynäkologie*, 1898, No. 5) reports a case which shows that the intra-uterine use of steam in cases of hemorrhage is not free from evil results. The patient, aged twenty-seven years, had a return of the menses four months after delivery, the flow continuing for eight weeks. This was at once checked by steam, and did not return, the patient suffering from the usual symptoms of the climacteric. Tablets of ovarian extract were given for some time, which caused severe abdominal pains, but no reappearance of the menses.

On examination two years after the labor the uterus was found to be small and hard, and the externum obliterated by cicatricial tissue, so that a probe could not be passed. The ovaries could be felt indistinctly.

The Abdominal Reflex in Women.—BODON (*Ibid.*) believes that the abdominal reflex possesses a certain diagnostic value in doubtful cases. In pelvic cellulitis the reflex is not affected, while in pelvic peritonitis it is either diminished or weakened upon the affected side. Hence when a doubtful tumor is discovered on one side of the pelvis, and no difference in the belly reflex is found on the affected side, it may be inferred that the mass is situated in the pelvic connective tissue. If, on the contrary, the reflex on the affected side is weakened or absent, it is probable that the peritoneum is involved—i. e., there is an exudate around the tube and ovary, or a pelveo-peritonitis. In acute cases the writer often observed that when the abdomen was lightly stroked over the affected side, the patient was suddenly seized with a violent pain, which was entirely out of proportion to the mechanical irritation. This is probably explained by the movements of the inflamed peritoneum caused by slight, invisible contractions of the abdominal muscles. In one case the pain was felt on the healthy side.

From further experiments upon the round ligaments the writer concludes that these are the analogues of the cremasters in the male.

Pregnancy and Parturition Following Amputation of the Cervix Uteri.—AUDEBERT (*Annales de Gynécologie et d'Obstétrique*, January, 1898) concludes an interesting article on this subject as follows: Amputation of the cervix exercises an important influence upon subsequent pregnancy, frequently leading to abortion or premature delivery. During labor the membranes are prone to rupture prematurely, while in some cases the cicatricial tissue opposes an absolute impediment to dilatation, requiring multiple incisions to overcome it.

Intra-vaginal Pressure as an Aid in Abdominal Operations.—NEUGEBAUER (*Centralblatt für Gynäkologie*, 1898, No. 5) conceived the idea of assisting the removal of intra-pelvic neoplasms by elevating the pelvic contents by pressure exerted through the vagina by means of a colpeurynter. Before operating upon a case of extra-uterine pregnancy he introduced the rubber bag and distended it with water to its utmost limit. On opening the abdomen he was surprised to find that the tumor, which was previously situated deeply within the pelvis, now appeared immediately beneath the wound and was easily removed. As the colpeurynter was emptied, the pelvic organs sank downward to their normal position.

Appendicitis in its Relations to the Pelvic Organs.—KRÜGER (*Deutsche Zeitschrift für Chirurgie*, Band xlv., Heft. 3 u. 4) emphasizes the importance of the differential diagnosis between appendicitis and disease of the adnexa. Acute puerperal parametritis may begin in the same manner as perforation of the appendix, but the symptoms are less severe, those of diffuse peritonitis being absent.

It is more difficult to distinguish between perforation of the appendix and

the rupture of a pus-tube or ovary. If recovery takes place, the parametritis and para-typhlitic exudates can usually be diagnosticated by their characteristic shape and position.

Diseased adnexa are generally recognized from their close relation to the uterus. When these are associated with appendicitis the diagnosis may be exceedingly difficult.

Alexander's Operation.—SIMÕES (*La Gynécologie*, 1897, Nos. 3 and 4) concludes an elaborate paper on this subject with the following summary: The operation should only be performed in cases of movable uterus. Since metritis and prolapsus usually accompany the retro-deviation, curettement, amputation of the cervix, and colpo-perineorrhaphy should supplement Alexander's operation in cases of chronic retroflexion. Extra-peritoneal shortening of the round ligaments is preferable to all the other methods of supporting the uterus in its normal position, as it is the most simple and rational. Finally, statistics have shown that pregnancy is least likely to be interfered with after this operation.

PÆDIATRICS.

UNDER THE CHARGE OF

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ASSISTED BY

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The Clinical Variability of Rubella.—PÉRON (*Revue mensuelle des Maladies de l'Enfance*, October, 1897) records three cases of rubella in a family, one of which, in the person of the father, aged forty-five years, presented almost a typical picture of severe measles.

The first patient affected was a son, aged eleven years, who, after three days of mild prodromes, presented a rapidly spreading typical rubellous eruption, with enlargement of the post-cervical lymphatic chains, slight fever, secondary sore-throat, slight hoarseness, coryza, and infrequent cough. The attack terminated on the third day.

Fourteen days after the appearance of the son's eruption the father was taken ill, with violent headache, lassitude, and chilly sensations. Then followed violent attacks of sneezing, hoarseness, and cough. The latter became very frequent and distressing, and disturbed sleep as markedly as in the prodromal stage of measles. Toward evening of the fourth day the symptoms increased, the patient took to bed, passed a bad night, and awoke with a confluent and generalized eruption. There was slight cervical adenopathy. With the appearance of the eruption there were abundant coryza, lachrymation, and conjunctival injection. Upon the uvula was seen a typical rubellous mottling.

Temperature 103° F. The eruption lasted four days, and on the second day the morning temperature was 101.4° F. The eruption disappeared progressively; but for fifteen days, at least, the voice remained hoarse and the cough frequent and distressing. Convalescence was slow. The tongue was thick and coated for several days. Cerebral and muscular activity was not regained for several weeks.

On the eighteenth day after the son's eruption appeared, the youngest child, aged four years, was seized with slight illness, and in a few hours showed a slight rosy blush of the face. Upon the body was noted only a slight rose coloration of the buttocks and loins. The ganglia of the neck were slightly tender on both sides. There was no buccal eruption, and temperature was 99.5° F. The whole condition had passed away by evening of the same day.

It is further stated that measles had not occurred in this family at the time of the illness above described; but the father had passed through an attack in his childhood, and, moreover, typical measles was subsequently contracted by the two boys and another brother during the same year.

In support of the rubellous nature of the father's attack the author calls attention to the period of incubation of seventeen days in his case, and of eighteen days in the younger boy's, and to the brusque appearance and rapid generalization of eruption in both these patients.

The Therapeutic Value of Laparotomy in Tuberculous Peritonitis.—MONTI (*Wiener klinische Wochenschrift*, 1897, No. 42, S. 935) concludes a paper on this subject before the Twelfth International Medical Congress with the summary:

1. Tuberculous peritonitis, with serous exudate, can be cured by internal treatment, though much less frequently and always more slowly than by laparotomy.

2. In such cases operation gives very good results, but relapses and subsequent outbreaks of tuberculous processes in other parts of the body are, nevertheless, not necessarily prevented.

3. In tuberculous peritonitis, with extensive adhesion of intestines or coincident swelling of the mesenteric glands, with which there is little fluid exudate, the results of operation are not satisfactory, and may lead to an unfortunate termination.

4. Experience up to the present is too slight to determine with certainty the value of laparotomy in the treatment of tuberculous peritonitis, except in cases with serous effusion and without extensive adhesions of the bowels or swelling of the mesenteric glands, in which good results may be expected.

Unilateral Secretion of Tears in Facial Paralysis.—EMBDEN (*Société de Médecine de Hambourg*, October 29, 1897) reported the observation of a girl of four years, received into the hospital for a fracture of the skull, whose recovery was followed by a right facial palsy, with coincident paralysis of the uvula. Final examination at time of discharge showed the following condition:

There was palsy of the three branches of the right facial with the signs of degeneration. Crying was attended by secretion of tears from the left eye only, while the right eye remained dry. Redness of the face and increased

nasal secretion attending the act of crying remained localized to the healthy side. The functions of all the other cranial nerves remained normal. This observation, the author thought, seemed to support the view of Goldzieher, who considered the facial nerve to possess a secretory function.

New Researches upon Arrest of Growth and Infantilism.—VAN DEN CORPUT (*Académie de Médecine de Belgique*, October 30, 1897) made a report upon the memoir of HERTOGHE, of Antwerp, in which that writer contends that arrests of growth, even when not myxœdematous in origin, such as are due to rhaehitism, hyperazoturia, congenital syphilis, onanism, and other conditions, are amenable to thyroid treatment. He goes on to show that all arrested growth is dependent primarily upon an alteration of the thyroid gland. He distinctly asserts that the deleterious influences which retard growth exert their earliest effect upon the thyroid gland, which, as variously affected in its functions, produces, according to the degree of the lesion, obesity, rhaehitism, chondro-dystrophy, or, finally, myxœdema more or less complete.

Arrest of growth by toxic substances, like tobacco and alcohol, he believes, is brought about in the same way through the functions of the thyroid gland. The nature of infantilism is thus considerably simplified.

Hertoghe has also studied the influence of the thyroid upon the development of the reproductive organs, and concluded that hypertrophy of the thyroid is the first sign of beginning puberty, and is indispensable to the adequate development of the sexual organs at puberty. According to this view, thyroid feeding finds a distinct indication in retarded puberty. [This paper, of which so far only a brief abstract has reached us, seems to open up a wide and fertile field for investigation.]

Transmission of the Power of Typhoid Agglutinative Action through the Milk.—LANDOUZY and GRIFFON (*Société de Biologie*, November 6, 1897) reported the observation of a woman of nineteen years, ill of typhoid fever three months after her confinement. The disease was of moderate severity and the serum reaction was positive. The child, which she had been nursing, appeared to be in perfect health. Examination of its blood showed that the agglutinative power was quite distinctly marked. This transmission of the agglutinative action of the blood-serum from mother to offspring has already been observed in mice by Widal and Sicard. The case recorded, therefore, proves that the same fact may be predicated of the human animal.

The Broncho-pulmonary Complications of Measles.—HUTINEL (*Presse Médicale*, 1897, No. 38, p. 205) presents an interesting study of this subject, which may be epitomized as follows:

A simple infection of the bronchial mucous membrane, due to the usual unhygienic causes in association with the ordinary pyogenic bacteria, may, under certain conditions, become contagious when the virulence of these germs has been greatly increased. For example, if a child already suffering from streptococic broncho-pneumonia is admitted to a hospital ward containing children with simple measles, the latter cases quickly become complicated, more or less seriously, with the same pulmonary lesion.

A child who previously to his measles has had a broncho-pulmonary infection may have a reappearance of this infection with the outbreak of measles, even though he had been apparently well of the precedent trouble for some little time. The previous existence of actual broncho-pneumonic lesion is not necessary, provided the infection itself has existed. Taken in its widest sense such pre-existent infection embraces the subjects of former tuberculosis, those that have had simple or specific catarrhs or localized pharyngeal infections, and finally those old hospital sojourners whose mouths and nasopharynges have had a chance from their surroundings to become infected with virulent microbes.

The crowding together of children increases the virulence of germs and the number and gravity of the infections. Frequently one observes the progressive aggravation of measles in isolating wards which cannot be frequently disinfected. Cases usually enter these pavilions in successive series. The first are usually benign cases; in the second series the fever falls less promptly, and more or less serious complications are noted; with the third series broncho-pneumonias often appear. These at first do not seem severe, but soon the severity of the complication increases, and fatal cases or subacute broncho-pulmonary infections become common.

It is to be observed that not only pre-existent infections of the respiratory passages may cause broncho-pneumonia in rubeolous patients, but the infection may be heteromorphous. A child may present a more or less grave cutaneous infection; following a measles he has a chance of infecting the lung. An intestinal or buccal infection may act in the same way.

Clinically the broncho-pulmonary complications of measles present three principal types: 1. A very acute form developing as a suffocative catarrh; 2. An acute form having all the characters of broncho-pneumonia; 3. A subacute or delayed form, suggesting tuberculosis, which may be called a pseudo-tuberculous broncho-pneumonia.

In order to avoid the broncho-pulmonary complications of measles it is therefore necessary to realize as much as possible the asepsis of rubeolous patients and to disinfect the quarters in which such patients are cared for.

Gangrene of the Soft Parts of the Thorax Following Measles.—WUNDER (*Münchener medicinische Wochenschrift*, 1897, No. 20, S. 536) reports the case of a girl, aged two years, who, on the tenth day of an attack of measles, presented a plaque of gangrene the size of the palm of the hand upon the right lateral aspect of the thorax, below the axilla. The periosteum of the subjacent ribs was laid bare, with a part of the great pectoral muscle. Cure resulted without functional impairment after a large abscess had developed in the internal aspect of the arm facing the gangrenous area.

The author attributes the localization of gangrene to the habit which the child had of lying on its right side. The compression had produced thrombosis of the long thoracic artery, with consequent gangrene of the tissues, whose power of resistance had been weakened by the disease.

Contribution to the Pathology of Pertussis.—Reasoning from the analogy of many other infectious diseases, FRÜHLICH, of Breslau (*Jahrbuch f. Kinderheilkunde*, 1897, Bd. xliv.), has succeeded in discovering that the blood

of children suffering from whooping-cough shows an enormous increase in the leucocytes, which is especially marked in the third or fourth week—that is, at the maximum of intensity of the disease. This leucocytosis is principally due to the lymphocytes, which are especially increased as compared with the polymuclear cells and the eosinophiles. In some of the cases this lymphocytosis reached 50 or 60 per cent., an unusually high degree as compared with other forms of leucocytosis, in which ordinarily a proportion of only 15 to 20 per cent. is reached. In these cases, however, the age of the patients must be taken into account, since leucocytosis with predominance of lymphocytes is, according to Weiss, very common in childhood.

The cause of leucocytosis in pertussis, Fröhlich thinks, can be explained by the fact demonstrated by Blumenthal, that there is a constant increase in the amount of uric acid excreted in the urine of these patients. Moreover, Horbaczewski has shown that in infectious diseases there is a constant relation between the exaggerated elimination of uric acid and the increase in the white corpuscles. The author suggests that the knowledge of the existence of leucocytosis in pertussis can be of practical value in the diagnosis of doubtful cases, especially where the clinical picture is incomplete, and in preventing children with a spasmodic cough, which is not really pertussis, from being exposed to the disease among other children with well-marked and undoubted clinical symptoms.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE DIRECTION OF

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The Bacteriology of Whooping-cough.—The results of investigations on this subject have been quite contradictory until within the last few months, during which period three investigators have published results which practically agree. DEICHLER (*Zeitsch. f. Wissensch. Zool.*, 1887, Bd. xi.) described a protozoan which he found constantly in the sputum of whooping-cough. Later KURLOFF (*Centralbl. Bakt. u. Parasitk.*, 1896, Nos. 14 and 15, Bd. xix.) described flagellate bodies. AFANASSIEFF (*St. Petersburger med. Woch.*, 1887) and SENTSCHENKO (*Wratsch.*, 1887) described a bacillus which they found constantly in the sputum. M. COHN and H. NEUMANN (*Archiv f. Kinderheilk.*, 1893, Bd. xvii.), after a prolonged study, came to a negative conclusion in regard to the bacillus, considering it as a saprophyte normally present in sputum, and described a diplococcus which they had met with constantly. About the same time RITTER (*Berl. klin. Wochenschr.*, 1892, p. 1276; 1896, No. 47, p. 1040, and No. 48, p. 1069) described a diplococcus which did not correspond to that of Cohn and Neumann. The work of the earlier investi-

gators, LETZERICH (*Virch. Arch.*, 1874, Bd. ix.), TSCHAMER (*Jahrb. f. Kinderheilk.*, 1876, Bd. x.), BURGER (*Berlin. klin. Woch.*, 1883), MONSORRO (*Rio de Janeiro*, 1883), is unimportant. KOPLIK (*Centralbl. für Bakteriolog. u. Parasitk.*, vol. xxi. p. 222) reports the examination of sixteen cases occurring in his service at the Good Samaritan Dispensary, New York. In thirteen of these cases he found, both in cover-glass preparations of the sputum and in culture, a bacillus which, when stained by Löffler's alkaline methylene-blue, appeared as a short, slender rod, thinner than the diphtheria bacillus and one-third its length. It had a beaded appearance, and in old culture showed distinct clubbed ends, which stained a dark blue. The organism was motile and did not form spores. In sputum the bacillus was in immense numbers in the small whitish masses which occur, and was often enclosed in the pus-cells. To make cultures the sputum was collected in sterile Petri dishes, and after standing one hour the small clumps were picked out and placed on culture media. Coagulated hydrocele fluid was found to be the best culture medium. In pure culture the organism grew in a fine-pointed layer of pearl-white colonies. If one-third its bulk of glucose bouillon was added the colonies appeared cream-colored, resembling somewhat those of the diphtheria bacillus. It could be grown anaërobically, and did not liquefy gelatin. White mice inoculated with 0.5 c.cm. of fresh bouillon culture died at the end of a week, and the organism could be recovered from the blood. In some cases the spleen was enlarged. An inoculation of 2 c.cm. killed in twenty-four hours with general cedematous infiltration of subcutaneous tissues of back. Subcutaneous injections in rabbits and guinea-pigs were negative. Intravenous injections of old culture in rabbits produced pyæmia or suppuration of the joints. There were no lesions of the lungs or characteristic convulsive symptoms in any of the animals. In uncomplicated cases the bacillus was found in immense numbers, sometimes in pure culture. In cases with bronchitis or broncho-pneumonia, it was generally overgrown by the pneumococcus or the streptococcus. The writer considers that it corresponds to the bacillus described by Afanassieff; and that while more observations are needed to determine definitely its relations to whooping-cough, it must, nevertheless, be considered as an important organism in the bacteriological consideration of this disease.

CZAPLEWSKI and HENSEL (*Centralbl. für Bakteriolog. und Parasitk.*, December 22, 1897) report the examination of the sputum in forty-four cases. Their methods consisted in staining cover-slip preparations with carbol glycerin fuchsin, and in making cultures from sputum lumps after washing in peptone solution to get rid of other organisms which might be present. They describe a short bacillus with distinctly staining, rounded ends, sometimes occurring in short chains, commonly in pairs, and often so small as to resemble cocci. This organism occurred constantly in the sputum, generally in immense numbers, and increased in numbers as the disease advanced. It occurred both free and in pus-cells. They obtained it frequently in pure culture, though in complicated cases it was difficult to avoid the streptococcus and the pneumococcus. It grew well on all the ordinary media except potato. On agar the growth appeared as small, dew-like, pointed colonies. The bacillus had the same general characteristics as the bacillus described by Koplik, with the exception of motility. They believe that Koplik's bacillus

is identical with theirs; and that Burger also described it in 1883. Their animal inoculations were negative. The bacillus was demonstrated in thirty cases. [Both from their description and from the excellent micro-photographs accompanying the article we are strongly reminded of a small diplo-bacillus commonly met with in routine examination of the throat in diphtheria.]

C. SPENGLER (*Deutsche med. Wochenschr.*, December 23, 1897), in some remarks on the communication of Czaplewski and Hensel, states that he found a similar bacillus to be commonly present in the sputum in an epidemic of whooping-cough which he had studied three years previously. He had delayed reporting his observations until another epidemic should furnish him an opportunity to confirm his results. He questions the methods of the above-named authors, and points out contradictions in the descriptions. The bacillus found by him agrees in general with the description which they give.

Typhoid Infection without Intestinal Lesions.—SIMON FLEXNER and NORMAN McL. HARRIS (*Johns Hopkins Bulletin*, December, 1897) report a case of typhoid septicæmia in a patient who died of gangrene of the lung with pyo-pneumothorax. There was nothing in the clinical history of the case to suggest typhoid. The patient was admitted to the hospital two days before death. There was evident pneumothorax on the right side, and the blood-count gave 18,000 leucocytes. The only condition shown by the autopsy was thrombosis of a branch of the pulmonary artery, gangrene of the lung, and perforation of the pleura. There was no glandular enlargement anywhere, and although the spleen is described as acute splenic tumor, it weighed but 160 grammes, which is well within the variations of normal. Cultures from the blood and various organs gave bacilli which responded to all the tests for the bacillus typhosus, including the serum reaction. On histological examination of the organs none of the tissue changes common to typhoid were present.

Notes on an Experimental Investigation Into the Growth of Bacillus Typhosus in Soil.—JOHN ROBERTSON (*British Medical Journal*, January 8, 1898), after searching with negative results for the typhoid bacillus in the soil of a "typhoid area" (consisting of a group of seven cottages where eighteen cases of typhoid fever had occurred during eight and a half years), attempted to ascertain if it were possible for the organism to grow in the soil, and if so, under what circumstances. On May 10th he removed the vegetation from three patches of earth, each eighteen inches square, and inoculated each patch with 200 c.c. of a twenty-four-hour bouillon culture of the typhoid bacillus; one on the surface, one at a depth of nine inches, and the third at a depth of eighteen inches. No vegetation was allowed to grow on the patches. The soil was a clayey loam with strata of sand and clay below. The ground water level was high, often reaching to within three feet of the surface. On August 26th, after a season of comparatively dry weather (total rainfall 5.2 inches), and an abundance of sunshine, cultures were taken from each patch; and in each case the organism was found in sufficient numbers to indicate that new growth had taken place. On October 20th, after much wet weather, cultures were again taken with a similar result.

On November 27th, after cold, damp weather, the temperature often being below 32° F. (for one week averaging 23° F.), cultures were taken for a third time, with negative results. A second group of three similar patches planted in August also gave negative results on November 27th. From January until June, at intervals of two weeks, the second group of patches received dilute organic solutions (beef-tea, etc.), which the first group did not. On June 3d and July 11th each of these patches so fed showed the presence of the bacillus typhosus, while the others did not. That no lateral extension of the growth took place was shown by negative results in culture taken from soil at distances of one, three, and nine feet from the patches. As to the effect of sunlight, it was shown that only organisms directly exposed were destroyed. Cultures at a depth of one-sixteenth of an inch were positive. The methods used for identifying the typhoid bacillus were those commonly used, including the serum reaction. The writer concludes that the typhoid bacillus is capable of growing rapidly in certain soils, and under suitable conditions may survive from one summer to another. He compares the patches which he fed artificially with organic solutions to soil which receives a large amount of organic material through defective drainage; and considers the nutrient material or natural culture medium thus afforded as the essential element in the continuance of the organism in the soil.

A. New Form of Serum Reaction with Colon Bacillus and Proteus Bacillus.—Previous work has shown (PFANDLER, *Centralblatt für Bacteriologie*, January 19 and 28, 1898) that an agglutinating reaction may occur in colon infections, but that it is rare and poorly marked. The author investigated the serum reaction in eight cases of colon infection, of which six were cystitis where the colon bacillus was isolated from the urine, the seventh was an enteritis with a general colon infection, and the eighth was a general peritonitis from intestinal perforation, and the organism was obtained at the time of operation. A case of proteus infection giving the proteus bacillus in the urine and a case of enteritis giving the bacillus laetis aerogenes in the urine and stools complete the series. Rather large amounts of blood were drawn and the serum obtained by centrifugalization. Three loops of a twenty-four-hour culture of the organism upon agar were mixed in a tube of bouillon, and this suspension was mixed with the serum in proportions of 1 to 10, 1 to 30, 1 to 50, and 1 to 100. Hanging-drop preparations were made of each dilution upon a hollow slide. Serum-free controls were made for comparison. No reaction occurred after two hours, but on standing for twenty-four hours it was found that, while the control drops had not altered their appearance, except by multiplication of the bacilli, the serum mixture showed the bacilli as very fine threads which were coiled around each other, forming distinct balls. In the weaker dilutions the clumps were isolated from each other or connected by fine threads. Between these knots the fluid was quite free from organisms, and the cells and knots themselves showed no trace of motility. Individual bacilli or very small groups of these were rarely found and were surrounded by the labyrinth of threads. In the macroscopic preparations of serum and bouillon there occurred a gross reaction in which the uniform clouding was replaced by partial clearing of the medium. Inoculations of these clumps upon agar gave back the colon

bacillus without change in its morphology. This reaction occurred only when the serum and the bacillus came from the same individual. A second essential for the reaction is that the patient should have a fever temperature. This is explained by the author by the assumption that a substance is formed in the body which will act upon the bacilli in the characteristic way only if the infection is intense, and the most common index of intensity is fever.

Immunity and Serotherapy against Yellow Fever.—SANARELLI (*Annales de l'Institut Pasteur*, October, 1897) says that most of the autopsies which he made in yellow fever were made shortly after death, and he often found the blood in the heart not coagulated, and collected the serum. The appearance of the serum varies: it may be transparent and clear, or slightly colored by blood or bile admixture. The yellowish serum may take a greenish tint by exposure to light. The serum of the cadaver produces the phenomena of agglutination on cultures of the bacillus *icteroides*, but the reaction is very variable. It has no inhibiting action against the organism. He obtained a considerable amount of serum from a convalescent eleven days after recovery, the man being still jaundiced. The serum was greenish, lipid, and transparent. It produced agglutination very slowly, and had a feeble inhibiting action against the organism when inoculated. Simultaneous injection of the serum with the virus was effective, but there was no effect when the serum was injected twenty-four hours before the inoculation. The organism is not destroyed in the serum, but remains alive for a long time. Other sera had no action. Antidiphtheritic serum and antityphic serum had no agglutinating action on the bacillus. Immunity against the disease is conferred in man by an attack. In experiments on the production of artificial immunity he gave up the use of rabbits, sheep, and goats on account of their sensitiveness to the organism. The immunity experiments were carried out on the guinea-pig, the dog, and the horse. The guinea-pig is difficult to immunize. He used for some weeks small doses of the filtered cultures or the pleural and peritoneal exudation of a goat killed by inoculation with the bacillus. After about one month of the treatment, and some days after the last injection, 0.1 c.c. of the virus was withstood. This quantity is absolutely fatal to the non-treated animal. During the treatments the weight of the animal reduces and by following the oscillation of this the treatment may be increased or diminished. Even with the greatest care these vaccinations produce a high mortality. In most cases it takes six or seven months before an animal is thoroughly immunized. The dog can be immunized much more rapidly than the guinea-pig. Immunity can be produced simply by injecting filtered cultures or cultures sterilized by ether. This proceeding produces infiltration and large purulent collections in the tissue. After this come the intravenous injections. The dogs are extremely sensitive to these injections; they vomit and have fever for several days. In seven or eight months they have an immunity against toxic doses of the bacillus. No matter how well vaccinated, the dogs are not proof against very large doses of the toxins. The beef stands subcutaneous injections better than the horse, but cannot stand the intravenous injections. The horse is given small doses (5 to 10 c.c.) of the filtered culture subcutaneously. These injections are followed by elevation of temperature,

which lasts several days. During this period the injections are discontinued. Intravenous injections should begin with small doses of the filtered cultures. They are well tolerated, and only produce a slight elevation of temperature. After each injection there are trembling and dyspnea. Care must be taken not to inject outside of the vein. Five or six months after the beginning of the treatment injections with living cultures may be attempted. The production of immunity is in any case a slow and painstaking matter. He kept up the vaccination so long that some of the animals could be considered as hyper-vaccinated. One c.c. of the serum of a guinea-pig so inoculated was effective when injected twenty-four hours before a fatal dose of the virus. Of twenty-six guinea-pigs inoculated with the virus, twenty were treated with serum; six not. The six died in six to twelve days; of the twenty treated, three died between the tenth and sixteenth day. The dog-serum was strong. It gave the phenomena of agglutination to a marked degree. The efficacy of the serum of the dog does not seem due to antitoxic properties. The preventive action is more efficacious than the curative action. Ill success was met with in the production of horse-serum—two of the horses dying. A third horse gave a serum which was feeble.

[The sera were only tried with the guinea-pig—an animal which is rather resistant to the virus—and the results obtained, though interesting, do not give much hope for the application of serum-therapy against the disease.]

Staining of Müller's Granules.—NICHOLLS (*Philadelphia Medical Journal*, February 26, 1898) reports the successful staining of the "dust bodies" of the blood, first described by Müller in 1896. His method consists in adding minute quantities of Ehrlich's neutrophile stain to 0.5 per cent. saline solution and allowing it to flow under a cover-slip of fresh blood sealed with vaseline. Eosine added in the same way stains the large granules. This he considered as completing the chain of evidence necessary to prove the theory of Stokes and Wegefarth.

The Presence in the Blood of Free Granules Derived from Leucocytes, and their Possible Relations to Immunity.—STOKES and ARTHUR WEGEFARTH (*Johns Hopkins Hospital Bulletin*, December, 1897) refer to the observations of Müller, who described small round colorless bodies as constantly present in the blood of both healthy and diseased persons. Müller did not attempt to explain the origin or composition of these bodies. The authors were able to demonstrate the presence of such bodies in blood taken from the lobe of the ear in 500 individuals, of whom 100 were healthy. They found the granules were most easily seen in artificial light obtained from a Welsbach burner. The granules are increased in number by the addition of dilute solutions of acetic acid to the blood, and they are believed to come from the granular leucocytes of the blood, either the oxyphile or the eosinophile. A number of observations have shown that the bactericidal powers of the blood-serum are diminished when it is collected without leucocytes, and that such serum may be made bactericidal by the addition of leucocytes. The authors filtered dog-serum through porcelain filters, and found a decided difference in the bactericidal powers of the serum before and after filtration. The unfiltered serum produced agglutination in the cholera, Finkler-Prior,

and typhoid bacilli in from fifteen to twenty minutes, and the filtered serum showed no action in three hours. The filtered serum had no action on the same organisms, while the unfiltered destroyed them. They were not able to perfectly restore the bactericidal action of the filtered serum by the addition of leucocytes containing the granules. They advance the theory that the bactericidal power of the leucocytes of the blood, and of the serum of man and many animals is due to the presence of specific granules, especially the eosinophilic and the neutrophilic. When called upon to resist the action of invading bacteria the granular leucocytes can give up their granules to the surrounding fluids or tissues.

Miliary Tuberculosis.—RIBBERT (*Deut. med. Woch.*, December 30, 1897) replies to Weigert's criticisms of Wild's conclusions with regard to the occurrence of miliary tuberculosis. Wild does not accept Weigert's doctrine that all the bacilli necessary for the production of miliary tuberculosis are derived from tubercles of veins or lymph vessels, regarding it as highly improbable that such great numbers as must be required for this could enter through a lesion so slight as in most cases to be invisible macroscopically. To Weigert's objection that in some cases but few or no tubercle bacilli may be found in the blood, Ribbert replies that he believes with Wyszokowitseh, that the bacilli may disappear from the blood, multiply in the organs to which they have been carried, and later again enter the circulation. Ribbert believes that the multiplication of the tubercle bacilli in the blood is dependent upon various conditions: a high degree of toxicity of the bacilli, diminution of the resistance of the invaded organisms, and predisposition. He holds that the connection between tuberculosis of veins or lymph vessels and miliary tuberculosis, in the sense that all the bacilli necessary for the general infection come from one point of entrance, is not proven, and that in most cases only a few enter the blood. He believes that proliferation of the bacilli takes place in the blood under certain conditions in those individuals who are predisposed, and in others whose resistance has become diminished.

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AN INQUIRY INTO THE ETIOLOGY OF CANCER.

WITH SOME REFERENCE TO THE LATEST INVESTIGATIONS OF THE
ITALIAN PATHOLOGISTS.¹

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THE subject of the etiology of tumors, benign and malignant, seems to me the most important and, at the same time, vexed problem now before the surgical pathologists of the world. The universality of their distribution, their general prevalence, their horrible malignancy, and the futility of all save operative methods of treatment, combine to make cancers the most dreaded, because the least understood enemies of the human race.

To attack this problem successfully, pathologists of the future must begin by studying tumor-formation in the vegetable world before studying it in animals—*i. e.*, the comparative method of investigation must be adopted.

Xylomata, or woody tumors, are so exceedingly common that they have failed to attract the attention which they deserve. A large proportion of these growths in trees and shrubs are of parasitic origin; the rest of them are undoubtedly due to disturbance or injury, such as follow traumatic or external irritation. A careful study of them will

¹ A report submitted to the American Surgical Association, April, 1898, by the Chairman of the Committee on the Nomenclature and Study of Tumors.

In submitting the following paper as coming from the Committee on Nomenclature and Study of Tumors, I wish, first of all, to assume the responsibility for any opinions therein expressed. The other members of the committee have kindly permitted me to present this communication as a report, in which, nevertheless, they have not taken personal part.

lend great aid in attacking the problem in its highest phases. Nevertheless, this is not the place to go into details of this description. It may not be amiss, however, to point out the great benefit that would accrue from a combination of botanists, zoologists, veterinarians, and our own profession, for the purposes of mutual aid in this matter.

Much reason as there is to consider malignant disease as in all probability an expression of infection, it will be worth while to devote a little time to the consideration of the causes of the more common benign tumors.

The *lipomata* are the most frequently met with of all, and must find their explanation in some disturbance of nutrition due to faulty innervation. This is easily explained, since they are usually of traumatic origin. The injury has usually been so slight and so long past as to be forgotten. Lipomata are frequently multiple, and then usually symmetrically placed, and such distribution can be explained only through the agency of the nervous system.

Fibromata, also, are usually of traumatic origin, and, if careful investigation be made, the majority will be found to contain minute foreign bodies, such as splinters, splinters, etc., which have served as the exciting cause, and which give these growths a strong resemblance to many of the *xylomata* already referred to. This is especially true of those fibrous tumors found about the hands and feet.

Myofibroma of the uterus, which is, strictly speaking, leiomyoma, has been of late regarded as of parasitic origin. Without placing great reliance upon the discovery, recently reported, of actual parasites, it is worth while, at least, to remember that some years ago Billroth made a careful study of these growths, and found that they always commenced by formation around a small bloodvessel. If, now, this be true we are compelled to view such neoplasms as due to something circulating through the bloodvessels—i. e., carried by the blood current, and, consequently, necessarily parasitic.

Chondroma is by all means most common in infancy and childhood, and its consideration is practically inseparable from that of rickets. Such cartilaginous tumors as are not to be explained as expressions of rhachitis are to be regarded as inclusions, according to the embryonal theory of Cohnheim.

Osteoma is, for the most part, to be explained on embryonal grounds (Cohnheim). It is often seen as an exostosis in the neighborhood of an epiphysis, or as an ossification of some cartilaginous "rest;" in many other cases it is the result of traumatic osteoperiostitis, or of syphilis or rhachitis.

Adenoma is the nearest approach to a malignant tumor which is consistent with a non-parasitic theory, and every surgeon knows how frequently an adenoma becomes converted into carcinoma. It requires

only the added impetus of a parasite to convert an innocent enlargement into an exceedingly malignant growth.

When now we come to *malignant tumors*, the only two theories which are at all worth consideration are the embryonal and the parasitic. All others are either secondary or subsidiary and included in one of the above. Thus the influence which trauma, previous inflammation, diet, surroundings, etc., may exert is to be regarded just as one would regard the same things in predisposing to or permitting tubercular or pyogenic infection.

The evolutionist's view of cancer is not, necessarily, that of the comparative pathologist, although they cannot vary much. If we accept, for instance, Williams's definition of cancer as "The expression of an indefinitely sustained power of certain cells to grow and multiply in excess of normal requirements," we have one which will apply to tumors either in vegetables, trees, or animals.

In the vegetable kingdom, it is hard to draw a distinction between various grades of malignancy. Nevertheless, that tumors kill a large proportion of trees and shrubs will not be disputed by those who have studied the subject. While the method of death in plants or animals is essentially the same—*i. e.*, through ulceration, starvation, and toxic action—the fact that diet cuts some figure among animals in this regard has been shown by Rayer, who found that carnivorous animals are more prone to cancer than herbivorous, just the reverse being the case concerning tuberculosis.

The evolutionists have shown us that an adult cell has a power of relapsing to an earlier or primitive condition, and thus may commence the neoplastic process. Thus cancers, as well as certain processes of repair, are by some regarded as reversions. The embryologists have also shown us that little particles, or foci, of embryonal cells may become imbedded in adult tissue, still retaining their primitive or unspecialized characteristics with their accompanying powers of independent growth.

The rapid multiplication of muscle-fibres in the uterus during pregnancy, or of the heart in hypertrophy, or of the connective-tissue corpuscles in healing wounds has shown us that cells of all descriptions possess remarkable reproductive powers in the presence of proper stimuli. In a genuine hypertrophy the new cells are a perfect type of their ancestors, and, as such, are true to the organism. Among benign tumors these new cells form by cellular division, and are of no utility to the organism. Imperfectly bred new cells may be of value to the body, as in cicatricial tissue; but the cells which have fallen from the first estate of their ancestors and are of a lower grade of vitality, and have become hostile to the organism, are those seen in sarcoma and carcinoma. This is the briefest and best epitome of the evolutionist's view of cancer.

Cancer has been also happily defined as an abortive attempt of gland epithelium to reproduce itself, in which respect it is a constant parody on true gland tissue. Sarcoma is a similar process pertaining to mesoblastic cells. It must now be asked, Can this failure in cell-breeding be accounted for only by a tendency to reversion, or only by the invasion of parasites, or by the occasionally inevitable combination of both? The evolutionist will insist that his view is correct, and that a parasitic feature, if present, must be accidental and secondary. In doing this he will claim that the essential, predisposing cause of cancer is senility—in other words, that, just as soon as the food supply begins to fail, liability to cancer begins, and that such malnutrition may result either from functional senility, or atrophy and instability, due to ancestral and reversionary tendencies. Thus, in the mamma and uterus, when function ceases such malnutritional changes commence. In the lips and tongue atrophic alterations are largely due to loss of teeth; while at the pylorus, the old gizzard region, we have a very common site for cancer. Or, to sum this up, just so soon as an organ or tissue begins to fail of nutrition, it is apt to begin preying on its own kind, like a plant running to seed in poor soil, in a desperate endeavor to hold its own, which, as Jonathan Hutchinson has termed it, is, in fact, a *rebellion of the cells*; and which, as his nephew, Woods Hutchinson, puts it, is, like many another rebellion, chiefly provoked by starvation and want.

Fascinating as is this view, it is, nevertheless, quite insufficient for our purpose. We used to be taught that cancer was exceedingly prevalent at certain ages, and perhaps this statement is correct when one sees but few instances of this trouble. For myself, however, living in a region where cancer is exceedingly prevalent, I have to witness the ravages of this disease in many relatively young people who are far below the supposititious cancer age; and the average practitioner who fails to recognize a malignant growth, merely because he finds it in a young person, is as sadly misled by old statements as is he who makes the same mistake because the patient did not complain of lancinating pains.

There are certain clinical considerations pertaining to the study of cancer which can hardly be omitted in a paper of this general scope.

(a) Influence of sex. Williams found, for instance, that for every 100 males dying of cancer, 223 females perished from the same disease. Of late years this disproportion has somewhat diminished; nevertheless, women are still more subject to malignant growths. Of cancer in women the breast is involved in 40 per cent., the uterus in 34 per cent., while the rest of the body furnishes the other 26 per cent. In males the parts about the mouth yield about 40 per cent. of the cases. Out of 1878 consecutive cases of cancer of the breast in both sexes the male mamma was involved in only sixteen instances. This discrepancy

between the sexes holds good mainly with regard to carcinoma, sex displaying but little difference in regard to liability to sarcoma.

(b) The most prolific cancer-producing age is that between the fifty-fifth and sixty-fifth years of life—i. e., at a time when the various organs are less active. With the period of tissue and organic maturity, the liability to cancer begins and increases until about the sixtieth year. That the uterus and breast are commonly attacked at an earlier age than other organs is due to their having become *passé* with the conclusion of child-bearing life. With the waning of developmental activities the danger of cancer increases, subsiding only when the organs have undergone complete atrophy. This is true of all known infections, whether cancer be one or not.

(c) Williams' careful studies have shown that, at least among females, there is a greater liability to cancer in *brunettes* than in blondes: although the blonde type prevails generally among the population, he found the disease was twice as frequent in brunettes as in blondes. Beddoe furthermore states that red-haired individuals are the most exempt of all. From our own census reports it appears that cancer is twice as frequent among whites as among blacks.

(d) *Heredity* of cancer is one of the most vexed questions regarding the dread disease. A family history of cancer will be obtained in from 25 to 35 per cent. of the cases; nevertheless, we must hold that not the disease but only the liability to it can be transmitted from parent to offspring. Even were the disease strictly hereditary, we should find a striking disproportion between it and congenital deformities or defects, or supernumerary organs, which are not transmitted from parent to offspring in anything like 25 per cent. of instances. While a history of multiple instances of cancer in the same family is extremely suggestive, it remains yet to be determined to what extent environment or infection from common sources may account for it. In other words, a notable family history of cancer is, of itself, rather an argument for the parasitic nature of the disease; while the so-called cancer houses have been more or less carefully studied by a London commission.

If cancer is transmitted by heredity it should tend to die out in the course of transmission, as do all abnormalities. Thus, Buxton found that out of 300 marriages in which both husbands and wives were deaf and dumb, the offspring were similarly affected in only 5 per cent. of cases, while of deaf mutes married to those that could hear the proportion of affected offspring was only about two-thirds of one per cent. Williams' two reported instances in which both parents were cancerous, who produced seven children, of whom two had the disease, as well as his collection of seven marriages in which only one parent was cancerous, from which resulted sixty-two children, of whom ten had the disease, are extremely important, although we are not able yet correctly to

interpret their entire significance. In this connection, also, there is Broen's celebrated report of the twenty-six descendants of cancerous parents who had attained or exceeded the age of fifty years, of whom fifteen died of the disease.

Williams further concludes that a large proportion of cancer patients are the surviving members of tubercular families; as also, that among families in which cancer prevails there is unusual fecundity, the children averaging four and six-tenths in healthy families, whereas in cancerous families they average eight and eight-tenths to each. Cancer appears to prevail in those who are subject to hypernutrition, this being true even of the survivors of tubercular families.

(c) Bencke has described cancer patients as having large hearts and arteries and small lungs; whereas in tuberculosis we have to do with small hearts and large lungs. Bencke also noted that cancers are rare in prisons, where animal food is not freely furnished and where work is hard. Nevertheless, vegetarians are by no means exempt.

(f) There can be no doubt that cancer is upon the increase. In 1840, in England, the proportion of deaths from cancer, as compared with the total mortality, was 1 in 129; in 1880 this had risen to 1 in 28. Williams estimated a few years ago that at least 40,000 persons were suffering from cancer in England and Wales; this augmented cancer mortality rate became conspicuous, notwithstanding great improvement in the general sanitary condition. In 1861 there were in England 376 deaths from cancer to the million of population. Twenty-five years later there were 610, and this at a time when the death-rate from phthisis had notably diminished. There can be no doubt that the proportion of this increased death-rate may be in part accounted for by more accurate diagnosis; nevertheless, the death-rate is unquestionably double what it was twenty or thirty years ago.

From the maps of the United States Census Bureau, as well as from various sources, I have learned that Buffalo, N. Y., is near the centre of an area some two hundred miles in radius where the death-rate from cancer is larger than in any other part of the United States. So prevalent is the disease with us that I have often made the remark that it is we who live in the "Tropic of Cancer."

From the returns of the New York State Board of Health during the ten years from 1885 to 1895 I find that there have been reported 30,692 deaths from cancer. In 1885 there were 1882; in 1890 there were 2878; and in 1895 there were 3454. In other words, in the last year of this decade the total number of deaths from cancer was twice that of its first year. It would seem to me, then, that I certainly have a right to assert that the disease is increasing in frequency.

. When Haviland published, in 1892, his *Geographical Description of Heart Disease, Cancer, and Phthisis for England and Wales*, he main-

tained that cancer is most prevalent in countries traversed by rivers, especially those which flood it; and less prevalent in mountain regions or where floods do not occur. Thus, he finds that the river Thames runs through a vast cancer field, save only where the chalk crops out. But Williams would explain the prevalence of the disease in the Thames Valley by the conditions of life peculiar to its population. He claims that cancer mortality is lowest where the struggle for existence is hardest, the population densest, the average duration of life shortest, and where the death-rate from tuberculosis is highest—*i. e.*, among the working classes; and that cancer mortality is greatest where the general standard of living is higher and life more easily maintained.

Much, also, of interest can be gleaned from the researches of Noel, which go to show a certain relation between arboreal cancers and those of man; that is, not only the frequency of malignant tumors in habitations surrounded by or near woods, but the relatively large mortality from cancer among those persons whose occupation obliges them to live amid these surroundings. The statistics of Julliard, Bierry, and Fiesinger, as well as his own, show that excise officers, who in certain parts of the country pass most of their time in isolated paths through woods, are very prone to cancer, as well as those country laborers who work in the woods. For instance, at Lyons, cancer of the lip is said not to exist; rather, all those who go there to be operated upon for this lesion come from the fields.

Cancer-bearing trees are not only exceedingly prevalent in woods and orchards, but it would seem that this plant lesion is contagious, many of them being found in the same neighborhood. Cancer seems to be most frequent in individuals living in isolated houses on the wooded banks of rivers. Insects, as Morau has experimentally shown, and especially the large wasps found in woods, seem to have a decided predilection for arboreal cancer, and may not only carry the infective material from one tree to another, but deposit it in human food. On these insects both protozoa and fungi abound. Hence the question may arise, Can cancer be disseminated through the agency of such insects, or can water, especially in the neighborhood of woods, act as a medium of transport? If the disease be conveyed in food, cancer of the alimentary tract will be the result; if by the finger or skin, any external portions of the body may be affected. The common solitariness of cancer infection in man is often emphasized as an argument against the parasitic theory, but it is now universally conceded that cancer may originate by multiple foci, and that general carcinomatosis and sarcomatosis correspond perfectly to miliary tuberculosis.

Hitherto inoculation experiments, at least in man, as well as for the most part upon the lower animals, have failed. There are a few ap-

partly authentic instances of transmission to the husband from cancer of the uterus. There is also much reason to think that about the mouth and perineum, where the mucous surfaces lie closely in contact, the disease may be spread from one part to another.

Experimental auto-inoculations have practically failed. In 1885 Morau reported inoculation of fragments from an epithelial cancer of a white mouse into ten other mice of the same species, with formation of cancer nodules in eight; which nodules were successfully used for further inoculation in yet other mice. More than this, he placed healthy mice in cages over a pan containing turpentine and camphor, by which they were kept free from insects and remained in perfect health. In other cages he placed white mice with bedbugs taken from the cages of cancerous mice, and observed after a few months that all of the animals infested by these insects were suffering from cancer.

In view, therefore, of all these clinical considerations the balance of this communication will be devoted to a consideration of the parasitic theory of cancer, and may, perhaps, be well prefaced by comparisons between cancer as we know it clinically and certain other universally acknowledged local and general infections. No safe inference can be drawn for or against the infectious nature of a given malady which is based solely upon a time limit. We have some infections, like those of bubonic plague, cholera, etc., which kill within a few hours, and thus present the most acute and distressing types of parasitic infection. There are others which require a few days, as tetanus, pneumonia, meningitis, and the like. There are yet others where the natural course of the disease takes one over a few weeks, such as typhoid fever. In yet others the disease requires at least a few months in which to run its course, as, for example, tuberculous, save in exceptional instances. Syphilis and leprosy require ordinarily a few years before they would kill through their own ravages.

Thus it will be seen that there are time variations within the widest possible limits, and one does no violence to the theory of parasitism if he accept the view that the infection which shall produce cancer may take a number of years to run its complete course.

Studying now, for a moment, the subject from an historical standpoint, let us, with Roncali, divide the past few years, during which any careful observations have been made, into four periods, as follows:

1. PERIOD OF INACCURATE OBSERVATION AND ERRONEOUS CONCLUSIONS. This begins with Nepveu, who in the year 1872 found microbes in epitheliomata. In 1886 Rappin, Scheurlen, Fraenkel, and others discovered cocci or other bacteria in malignant growths. In 1887 Scheurlen claimed to have discovered a specific organism, but his mistake was soon demonstrated. Besides Scheurlen, Ferrero, Schill, Perrin, Bernabei, Landerer, Maffucci, Babes, Kubassoff, Shattuck and Bal-

lance, as well as many others, recognized microbes in cancerous lesions, but failed to demonstrate their specificity.

2. PERIOD OF ACCURATE OBSERVATION AND INACCURATE CONCLUSIONS. This is essentially the coccidial period. It began with the discovery, by Halle, Virchow, and Gubler, of protozoa in human tumors. These were subsequently assigned to the class of coccidia by a number of observers, among whom the names of Rivolta, Podwysotszky, and Lindermann are best known. All of these observers became enthusiastic over, but were misled by, the well-known coccidiosis of the rabbit's liver. But there can be no doubt that the observers herewith mentioned observed parasites within and around cancer cells, though they were misled as to their nature. The most prominent of these investigators were D'Arcy Power, Fabre-Domergue, Duplay, Cazin, Török, Unna, Cornil, Kiener, Stroebe, Hlava, Obrzut, Pianese, Darier, Albarran, Malassez, Sjöbring, Bouehard, Clarke, Kahane, Foà, Soudakewitseh, Podwysotszky, Sawtchenko, Ruffer, Walker, and Vedeler. Of the correctness of their observations, at least in most cases, there can be no doubt; their mistake was in the interpretation of the phenomena. Nevertheless, the cell inclusions which they described were challenged by many other observers, who interpreted the phenomena in various ways.

Malassez regarded them as due to fatty degeneration; Török, Unna, and others spoke of colloid degeneration; cornuous degeneration was held by Kiener, Domergue, and Petersen; mucoid degeneration was claimed by Hlava and Obrzut; Cornil and Kiener claimed a degeneration of nuclei in polynuclear cells; Virchow held to an endogenous degeneration; D'Arcy Power regarded them as abortive karyokinetic formations which had undergone a peculiar hydropic degeneration; while functional chromatolysis or other aberrant mitotic formations, or irregular vacuolization, as well as a great variety of other changes, were insisted on by various other students. This endless variety of opinion was of itself conclusive proof that the truth had not yet been reached. Moreover, culture experiments were complete failures.

3. ICONOCLASTIC PERIOD OF DOUBT AS TO THE ACCURACY OF ALL PAST RESEARCHES. This period began with Russell's work in 1890, and concluded with the researches of Banti and Nisser in 1894. Thus, Russell described certain round, homogeneous, structureless bodies which he found in groups within the tissues, as well as within the cells, and which he regarded as fungi. Banti found the same objects in Paget's disease, and Nisser isolated from the blood of cancer patients certain blastomycetæ, which he considered to be the actual parasites of cancer.

4. PERIOD OF SUCCESSFUL INOCULATION, PRACTISED FOR THE MOST PART BY ITALIAN PATHOLOGISTS. The work of the Italians in this direction has been most creditable and apparently most convincing. It

has been done for the most part by Prof. Sanfelice, of the University of Cagliari, in Sardinia, and Prof. Roncali, of the University Surgical Clinic in Rome. The former published his first paper on the subject in January, 1895, and the latter followed with his first only a month later. To these two men and their assistants we owe most of that which I shall epitomize below.

As the work of these Italians points, with a high degree of probability, toward the blastomycetæ as the active agents, it will be worthwhile to stop for a moment and rehearse the most important facts known with regard to this class of fungi. It is best known as that to which the common yeast forms belong. These fungi reproduce themselves, not by division into halves, as do the common bacteria, but by the process of budding; the cells, when undergoing this process, appearing under the lens much like the common forms of cacti. Each bud provides itself with a membrane when separating from the parent cell, and thus becomes complete in itself. The parent cell does not die in this process, but gives rise to other buds, the entire process consuming about two hours in those forms where the life-history can be easily watched. This is slower cell division than occurs with the ordinary bacteria. The new cells thus produced are often bound together in clusters or irregular chains. Each cell has its proper membrane, which is filled with protoplasm, and contains a nucleus. It will average eight to ten millimetres in size. Under particularly favorable circumstances spore-formation may also take place, so that from two to ten endospores may be seen in one parent cell. These spores are less resistant than those of the common bacteria. They are killed by five minutes' exposure to 62° – 70° C. Those blastomycetæ which are capable of spore-formation are the least hardy, living in the ground for about a year, while others can live, under the same conditions, for three years. This is worth remembering, because there is much reason to think that these fungi are introduced into the system from the most common sources and by the ordinary paths of infection.

They will grow on media which are slightly or strongly acid, and by this means can be separated from many of the common bacteria. Each species has its own peculiarity as to behavior respecting the various sugars. For example, by an ordinary wine yeast 1000 grammes of grape sugar were split up into 506 grammes of alcohol and 30 grammes of other products, including 21 grammes of glycerin. (By the way, the taste of various wines is quite perceptibly influenced by the amount of glycerin present therein.) Alcoholic fermentation can go on with or without access of air. If air be present cell reproduction is more active, and other cell activity is lessened, and vice versa. Acetic fermentation must be aerobic, butyric must be anaerobic; lactic fermentation and putrefaction are facultative aerobic actions.

So far as pathogenic activities are concerned, blastomycetæ are known to be active disease-agents in certain cases. They are commonly found in the urine of diabetic patients, but whether by accident or in some other relation is not positively known. Numerous forms have been cultivated and inoculated, with resulting severe or even fatal symptoms—as in the morbid condition called saccharomycosis, which is known as an experimental disease. Thus it is established that a general infection from this cause is possible, and the question may arise whether general carcinomatosis is of this nature.

Now, it is almost exclusively the blastomycetæ with which the Italians have worked, and have produced their remarkable experimental results, for they have found these organisms both within and between and around cancer cells, and have succeeded in making cultures in and upon acid media. Moreover, by inoculations with these cultures they have produced tumors in animals which bear the strongest possible resemblance to those neoplasms from which the cultures were originally made.

These parasites must be sought for in the periphery of the tumors and in the juices of the same, but not in the central portions; for here they often seem to have disappeared. This is true both of sections for microscopic examination and of the portions which are taken for inoculation purposes. Furthermore, most of the experimental tumors thus produced have returned the same blastomycetæ upon further culture tests. Two or three different forms have been definitely named by their discoverers; thus Sanfelice has described a *saccharomyces lithogenes*, and Roncali a *blastomycis vitro-similis degenerans*. These names both call attention to the remarkable properties which some of these fungi possess, not only of undergoing a rapid degeneration, but of displaying a peculiar calcareous deposit within the cell membrane, which is undoubtedly due to calcium carbonate, since when these are treated with 4 per cent. solution of hydrochloric acid the degeneration forms all disappear, while when treated with 4 per cent. sulphuric acid crystals of calcium sulphate form. As showing also their marked tendency toward degeneration, Roncali placed two pieces of tumor in a Petri capsule, and kept it at 37° C. for four days. In the juices the undegenerated forms were undoubtedly much more abundant than in the fresh specimens, which would indicate their truly parasitic nature.

As an illustration of the method of securing cultures, he prepared in one case sixty tubes of distilled water containing a little sugar and acid; in each of them he placed small bits of tumor cut with a sterilized knife. These were kept at 37° C. for ten days, when surface growths were found upon forty-seven of them, which, when examined in the hanging-drop, were easily recognized as blastomycetæ.

Sanfelice has produced small tumors in numerous of the smaller ani-

mals by injection of his *saccharomyces* above alluded to. It is most interesting also that some of the *blastomyces* which he discovered in tumors were identical with those found upon the common lemon, which grows so abundantly upon Italian soil. Among other experiments, he injected the *saccharomyces* into the mammary gland of a bitch, which lived for fourteen months and then died with a definite tumor in the gland and with metastases in various organs. Also, after injecting this culture into the abdomens of guinea-pigs he saw them die in from twenty to forty days as the result of neoplastic lesions, while when injected beneath the skin they killed the animals in from thirty to fifty days, with local manifestations.

Thus, without quoting in detail the experimental labors of Sanfelice, Roncali, and their pupils, it may be stated as positively proven that the *blastomyces* above alluded to—i. e., at least some of them—are capable, first, of being isolated by culture methods from certain *carcinomata* and *sarcomata*; second, of identification as belonging among the yeasts; third, of producing tumors in animals by injection under suitable precautions, the resulting tumors being strikingly analogous to or identical with those from which the cultures were made; and, fourth, of furnishing from these tumors further cultures, from which yet other experimental inoculations can be made.

Without going so far as to say that this can be done in every instance, or that all cancers are necessarily of parasitic origin, one is justified by these results in at least maintaining that some cancers are positively of such origin. If, upon this experimental ground, one should infer that all cancers are parasitic manifestations, he would do, as will be seen, little violence to the laws of logic.

Certain laboratory methods and precautions must be observed in these studies. The culture media must be distinctly acid in reaction. The *blastomyces* in question will grow in distilled water sufficiently acidified, to which a little sugar has been added, or in any of the ordinary media, provided only that they be sufficiently acid. I suppose that one reason why they have so long eluded detection in these locations is because neutral or alkaline media have been those generally employed. For inoculation, the distilled water above alluded to, or bouillon cultures, may be used with a hypodermic syringe, and the culture injected into a testicle or into the abdomen, or a small quantity of the culture from a solid medium may be inserted beneath the skin after making a small incision.

With these fungi, as with many other organisms, it is necessary often to do something to enhance their virulence before they become markedly pathogenic. Here we take advantage of an artificial symbiosis, and grow them upon the surface of a tetanus culture some eight to ten days old. In this way the desired augmentation of virulence is produced, the

tetanus bacilli, being anaërobic, growing in the depths of the medium, while the fresh culture is planted upon its surface. Similar manipulation is often resorted to in the laboratory in connection with *baeillus pyocyaneus* and *baeillus prodigiosus*.

When it comes to the detection of these fungi in microscope sections, the methods are more or less complicated, and require considerable training in special manipulation and observation. The directions are as follows:

Pieces of the tumor taken from the margin of the growth, or at least from the outlying portions, are placed for ten minutes in a saturated solution of corrosive sublimate. The addition of a few drops of acetic acid while the pieces are immersed adds to the effect of the sublimate. After removal they are left for twenty-four hours in 60 per cent. alcohol, to which there is added ordinary tincture of iodine to remove the sublimate. It is added gradually until the solution ceases to be decolorized by decomposition. After this the pieces of tumor are hardened in strong alcohol in the usual way, cleared up in xylol, and mounted in paraffin. From these small masses sections are cut as usual.

If one desire to stain the entire mass before cutting the sections, it is placed, after leaving the alcohol, for twenty-four hours in lithium carmine, then for twenty-four hours in alcohol containing $\frac{1}{2}$ per cent. of hydrochloric acid. It is then hardened in alcohol and mounted as before.

When now the sections are cut, they are again freed from paraffin with xylol, treated with absolute alcohol, and left for from five to fifteen minutes in Ehrlich's fluid. After this they are washed in distilled water, put for five minutes in $\frac{1}{2}$ per cent. solution of oxalic acid, washed again with distilled water, and then in absolute alcohol until it is no longer discolored. They are now cleared in xylol and mounted in balsam. Prepared in this way, the parasites are of a purple color and the tissue red.

The second method, which we owe to Sanfelice, consists in placing the sections for from ten to sixty minutes, or longer, in the following solution:

Saturated watery solution of safranine	1 part.
Saturated alcoholic solution of malachite green	$\frac{1}{2}$ part.
Distilled water	$\frac{1}{2}$ part.

They are then washed in distilled water, decolorized by five minutes' immersion in $\frac{1}{2}$ per cent. oxalic solution, washed again in water, then passed through alcohol and xylol and mounted in balsam. Prepared in this way, the parasites take a green or bluish-green color, while the protoplasm is red and the nuclei safranine. Roncali suggests also the following solution:

Saturated watery solution of safranine	5 or 6 parts.
Saturated alcoholic solution of gentian violet	1 part.
Distilled water	3 or 4 parts.

Sections are left from two to four minutes in this fluid, after which they are treated as above. Thus treated, the parasites assume a purple and the tissues a red color. This method has the advantage of saving time, but does not display the parasites to nearly as good advantage.

For much of the above information I am indebted to a personal acquaintance with Professor Roncali, from whom I secured my first cultures and illustrative slides. His writings on the subject have been numerous and are mentioned below.

During a recent visit to Vienna I had also the advantage of noting what was being done in this line of research in the clinic of Professor Gussenbauer. Within the past year or so seven cases of melano-sarcoma have been carefully investigated by one of his assistants, with the result that from every case there has been isolated an anaërobic coccus which grows in ordinary media with a dark color. This color is not that which gives rise to the pigment of the active disease. This latter is due rather to a metamorphosed hæmoglobin which is known as melanine. Nevertheless, the coecus growing *en masse* assumes an almost brown or black color. Sufficient time had not elapsed when I last saw these cultures for experimentation, but it was proposed to inoculate them in horses, which are known to be peculiarly susceptible to melano-sarcoma.

Thus it will be seen that the problem of the nature of cancer, and consequently of its cure, is a most complicated one and must be studied from many sides.

The following list of papers and monographs pertaining to the subjects discussed in the above report is by no means complete, but will be found helpful by those studying the subject.

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A CONTRIBUTION TO OUR KNOWLEDGE OF THE ETIOLOGY OF INFLAMMATIONS OF THE ACCESSORY SINUSES OF THE NOSE.

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DURING the last year we have examined microscopically and by culture methods the material from eighteen cases of inflammation of the antrum of Highmore and the frontal and ethmoidal sinuses. We have

not had an opportunity of obtaining material from the sphenoidal sinuses. One case of antral inflammation (Case I.) came to autopsy, and we were able to study the inflammatory process histologically as well as bacteriologically. The material for histological study was obtained in two cases by curettage; in one from the frontal and in the other from the ethmoidal sinuses.

Our material was derived, for the most part, from the private practice and dispensary service of one of us (Ingersoll); but we are indebted to the courtesy of Doctors Bunts, Hamann, Sherman, Stephan, and Wenner for several cases of our list. Several methods were used to obtain material for study: (*a*) exploratory puncture with a trocar well up under the middle third of the inferior turbinal was made in the majority of antral cases; (*b*) through an opening in the alveolar border of the superior maxilla, after the extraction of a tooth; and lastly in two cases pus was obtained by means of a platinum needle in one case, and a cotton swab in the other, from or near the ostium maxillare.

In all cases care was taken to cleanse the nostrils and to avoid contamination of the pus and infection of the patient. Material was usually obtained from the frontal and ethmoidal sinuses at operation; but from the frontal sinuses it was obtained once by puncture and twice through spontaneous openings.

METHODS OF EXAMINATION OF MATERIAL. Both stained and unstained cover-slip preparations were studied. The kinds and relative number of the cells were noted. Tubercle bacilli and protozoa, except in a few cases, were looked for, but always with negative results. Cultures were made on coagulated blood-serum and on agar-agar plates. The pathogenesis of nearly all the micro-organisms found, including the well-known as well as the unusual ones, was determined on rabbits and guinea-pigs.

ANTRA OF HIGHMORE. Inflammatory processes have been described affecting these sinuses, following influenza, by Weichselbaum, Kuckenbecker, Ewald and Grünwald. Empyema of the antra secondary to erysipelas has been described by Znekerkandl, Zeim, Killain, Luc, and others. Bryan and E. Fränkel have reported cases occurring in variola. Bryan and Wolff have each described cases following scarlatina. Wolff found the antra inflamed in children dead of measles. Zaccarini, Vogel, Kern, and Grünwald note antral inflammation following typhoid fever.

A case of antral empyema due to the gonococcus, and succeeding gonorrhœal conjunctivitis and caries of the maxilla, has been reported by Fürst.

According to Dmochowski, antral inflammation secondary to acute rhinitis is not uncommon. Von Besser has reported a case of antral empyema occurring in pneumonia. Dmochowski has collected several cases of antral inflammation due to trauma. Langenbeck has reported

two cases succeeding section of the infra-orbital nerve. The relation of nasal polypi to antral disease has been dwelt upon by many authors, including Zuckerkandl, Dmochowski, and E. Fränkel.

The common hypertrophic rhinitis seems to favor antral inflammation. Zuckerkandl's explanation of the mode of action of nasal hypertrophies and catarrh in causing or favoring antral inflammation is an interesting and ingenious one. According to this view, the swelling or the secretion stops up the ostium maxillare, interferes with the ventilation of the cavity, and has a deleterious effect on the antral mucous membrane.

Sooner or later the enclosed air is absorbed and there is a negative pressure in the antral cavity. This pressure and the lack of ventilation may not only be possible causes of degeneration of the antral epithelium, but may assist the entrance into the antra of pathogenic bacteria from the nasal cavity. This theory would help to explain the common association between antral inflammation and these various chronic diseases of the nose. There does not seem to be any special relation between ozæna and antral inflammation.

The relation of dental caries and of periostitis and caries of the superior maxilla to antral disease is difficult to define accurately. For some authors nearly every case of antral inflammation is secondary to dental caries. Hartmann, in 16 cases of antral empyema, found only one case with a decayed tooth. Grünwald excluded the teeth in 21 out of 30 cases, and Goodwillie and others deny that dental decay has any part in the etiology of antral inflammation.

Of Dmochowski's 34 cases one was secondary to dental caries, and one of the cases of Herzfeld and Hermann was clearly secondary to this process. Zuckerkandl and many others report cases.

It should always be borne in mind that the coexistence of the two processes does not necessarily bespeak their etiological interdependence, and that unless anatomical evidence is convincing the connection is to be doubted.

Analysis of the 10 cases reported by Herzfeld and Hermann shows that one was associated with acute coryza; one followed dental caries and one diphtheria. Two others had nasal polypi.

Wolff has examined by Schalle's section method the accessory sinuses of the nose in 22 cases of diphtheria, in all of which there were changes in the antra.

In five cases of measles coming to autopsy Wolff found œdema and inflammatory changes in these sinuses. In two cases of scarlatina there were marked œdema and severe inflammation of the antra and sphenoidal sinuses in one case, and in the other antral catarrh, while the sphenoidal sinuses were normal.

Dmochowski found in his examination of the antrum in 152 autopsies antral inflammation in no case out of 5 of typhoid fever; in 1 case out

of 29 of pulmonary tuberculosis; in no case out of 11 of croupous pneumonia; in 1 case out of 17 of pulmonary emphysema; in 1 case out of 3 of pleuritis; in 1 case out of 2 of pulmonary gangrene; in 1 case out of 21 of heart disease; in 1 case out of 17 of neoplasms; in 2 cases out of 11 of endocarditis; in 1 case out of 3 of apoplexy; in 1 case out of 2 of leucæmia; in 1 case out of 5 of dysentery; in 1 case out of 3 of peritonitis; in 1 case out of 3 of meningitis; in no case out of 2 of hepatic cirrhosis.

E. Fränkel¹ studied the pathology of the accessory sinuses of the nose in 146 cases at autopsy, using Harke's method of sectioning the head. In the first 50 cases the sinuses were intact in only 28, and of these only 13 proved sterile.

In his second series, 63 cases, the accessory sinuses were pathological in 37.

A most remarkable showing is made by Fränkel's study of the relation of various diseases to inflammation of these sinuses. Of 48 cases of phthisis, there was antral inflammation in 9; of 20 cases of pneumonia, 12 showed inflammatory changes in the accessory sinuses, the antra being affected in 10 cases, in 6 of which the diplococcus lancetatus was present. Fränkel calls attention to the great frequency of inflammation of the accessory sinuses in diseases of the lungs, and even speaks of a pneumonic form of antral disease, viz., acute inflammation of the antrum usually due to the diplococcus lancetatus, occurring in the course of pneumonia. In three cases of typhoid coming to autopsy the accessory sinuses were normal. In five cases of cerebro-spinal meningitis the right antrum was inflamed in 1 case and the sphenoidal sinuses in 2. In 11 cases of peritonitis there was antral inflammation in 6.

¹ In anatomically normal sinuses E. Fränkel found the diplococcus in the frontal sinuses four times, in the ethmoidal three times, as well as in the antra. Besides this he found the aureus twice in the frontal sinuses, once in the sphenoidal sinuses, and the staphylococcus pyogenes albus in the frontal sinuses of one case. The bacillus mucosus capsulatus occurred in the sphenoidal sinuses of one case, and an anthrax-bacillus-like organism in the frontal and sphenoidal sinuses of another.

The sections were made in the cold season, and with a few exceptions within twenty-four hours and usually eight to ten hours after death. Fränkel argues that these were not post-mortem bacterial invasions, but that the micro-organisms were present in the cavities *intra vitam*. There are several important objections to this view; the first being the absence of micro-organisms from the normal nasal cavities in the majority of cases all established by the observations of Von Besser and others, and confirmed by St. Clair Thompson and Hewlett, and more lately by Park and Wright; and the second, the extreme probability of the early post-mortem bacterial invasion of these sinuses by bacteria from the mouth, pharynx, and nose, judging by our knowledge of the entrance of micro-organisms into the gall-bladder and liver from the intestines, and into the bronchi and lungs, after death. The protecting influences that tend to keep the nose and accessory sinuses free from micro-organisms during life are at an end after death, and all the conditions, such as position, proximity to the mouth, death of the epithelial cells, etc., are particularly favorable for their entrance and multiplication in the nose, with which the accessory sinuses are so intimately related. It is difficult to see, too, how it is possible to avoid contamination in a certain proportion of cases at least, from the nose and instruments during the necessarily rough manipulations incident to Harke's or any other method of exposing the accessory sinuses. On account of these evident objections we cannot accept Fränkel's conclusions on this point as free from doubt.

The antral and the sphenoidal sinuses were inflamed in one case of variola. Four cases of antral inflammation occurred in individuals with inflammation of distant parts of the body, viz., caries of the sacrum, decubitus of senile marasmus and multiple fractures, while in a case of phlegmon of the thorax Fränkel thinks that the process in the chest was secondary to antral empyema. Antral empyema was also found in an individual with pulmonary emphysema and in another dead of apoplexy.

Few records of bacteriological examinations of the contents of inflamed antra are to be found in the literature. Weichselbaum in 1886 seems to have been the first to describe bacteria in the antral contents.¹ In his article on the etiology of pneumonia (quoted by Kuhnt) he described finding the same micro-organisms (the *diplococcus lanceolatus*, the *B. of Friedländer*, the *streptococcus pyogenes*, and the *staphylococcus pyogenes aureus* and *albus*) in sections from the nose and the accessory sinuses as in the pneumonic lung.

Von Beser in 1889 found the *diplococcus lanceolatus*, and Luc in 1890 found the *streptococcus pyogenes* in a case of antral empyema.

In 1892 Weichselbaum found inflammatory changes in the accessory sinuses in four of six individuals dead of influenza. The sphenoidal, with both the frontal and the maxillary sinuses, were inflamed in one case, both antra in the second, the right antrum in the third, and the left frontal sinus in the fourth.

In the pus of two of these cases the *diplococcus lanceolatus* was present in pure culture, while in the other two cases, besides this organism, there were found a small coccus and some rod-shaped forms (the influenza bacillus?).

In a later article in the same year Weichselbaum describes two further cases of antral inflammation due to the *diplococcus lanceolatus*.

Zuckerkindl makes no mention of bacteriological examinations in his cases.

In an article by Lichtwitz, in 1894, mention is made of the observation of Sabrazès, who states, as the result of his examinations, that most cases of inflammation of the accessory sinuses are due to the *streptococcus pyogenes* alone, or with the *staphylococcus albus* or *aureus*, and the *staphylococcus albus* and *citreus*. He also found in two cases the *diplococcus lanceolatus*, and in one case a bacillus that was somewhat longer than the tubercle bacillus and decolorized by Gram.

Herzfeld and Hermann in 1895 reported the results of their examinations in ten cases of antral empyema. Their work was carefully done and the pathogenesis of the bacteria found was usually tested upon animals.

¹ In 1881 he described micrococci in sections of the walls of some of the accessory sinuses.

In Case I., which succeeded acute coryza, a streptococcus, a capsule bacillus, a colon-bacillus-like bacillus, and a proteus-like bacillus which liquefied gelatine were found.

In Case II., following influenza, the streptococcus pyogenes was found in pure culture.

In Case III., following dental caries, the streptococcus pyogenes, a non-pathogenic staphylococcus albus, a staphylococcus aureus, a non-pathogenic staphylococcus citreus and a staphylococcus ruber, a colon-bacillus-like bacillus and proteus-like bacillus were found.

In Case IV., with nasal polypi, they found a streptococcus non-pathogenic for animals, a pathogenic staphylococcus aureus and albus, a non-pathogenic staphylococcus, and a colon-bacillus-like organism like the one found in Cases I. and III.

In Case V. cultures gave a staphylococcus pyogenes aureus, a yellow sarcina, and four different kinds of bacilli which were non-pathogenic for mice. In Case VI., with nasal polypi, there was found in pure culture a bacillus like the B. of Friedländer, but differing from it in not forming gas.

In Case VII. the streptococcus pyogenes, the staphylococcus pyogenes aureus, a non-pathogenic staphylococcus aureus, and a bacillus something like the typhoid bacillus were present.

In Case VIII. there were present a streptococcus, the staphylococcus pyogenes aureus, a staphylococcus albus, a yellow sarcina, and a bacillus non-pathogenic for mice.

In Case IX. they found a streptococcus, the staphylococcus pyogenes aureus and albus, a non-pathogenic staphylococcus albus, and an unidentified bacillus.

In Case X. there were present large numbers of streptococci non-pathogenic for mice, a staphylococcus pyogenes albus, and a bacillus like that of Case IX.

Herzfeld and Hermann failed to find tubercle bacilli in cover-slip preparations in any case.

An analysis of their cases shows that the streptococcus was the most common organism found. It was present once in pure culture, and seven times with other bacteria, the most important of which were staphylococci, with which it occurred in seven cases.

Staphylococci were never found alone. The staphylococcus pyogenes aureus occurred in five cases; the S. aureus (non-pathogenic for animals) in one; the S. pyogenes albus in three; the S. albus (non-pathogenic for animals) in four; the S. citreus and ruber (non-pathogenic) in one. A bacillus very like Friedländer's pneumo-bacillus occurred in pure culture in one case. Colon-like bacilli occurred in three cases; a typhoid-like bacillus once; a proteus-like bacillus once, and various unidentified bacilli, non-pathogenic for animals, were found in several

eases. In two cases yellow sarcinæ were found. The diplococcus lanceolatus was never present.

Dmochowski in 1895 examined bacteriologically the antral contents in 21 cases, 18 of which were inflammatory. He divides his cases as follows: in two cases of antral cysts with purulent contents he found the *B. pyogenes foetidus*; in one case with diphtheritic false membrane, the streptococcus pyogenes; in two cases of acute empyema, the staphylococcus pyogenes aureus in one, and the *B. pyogenes foetidus* in the other; in six cases of chronic empyema, the staphylococcus pyogenes aureus, the *B. pyogenes foetidus* (three times), the *B. pyogenes*, the pneumo-bacillus of Friedländer; in three cases of chronic empyema with exacerbation, the *B. pyogenes foetidus*, the pneumo-bacillus of Friedländer, the streptococcus pyogenes; in six cases of unclassified empyema, the *B. pyogenes foetidus* (three times), some unrecognized bacilli, and the streptococcus pyogenes (twice).

In the purely inflammatory cases an analysis shows the streptococcus pyogenes alone in three, the staphylococcus pyogenes aureus in three, the staphylococcus pyogenes albus in one, the *B. pyogenes foetidus* alone in five cases and with other organisms in five cases, the *B. of Friedländer* alone in one case and with other bacteria in one case and with the *B. pyogenes* in one case.

In a number of cases unidentified bacilli were found.

Wolff in 1895 examined bacteriologically the accessory sinuses in fatal cases of diphtheria, scarlatina, and measles. In twenty-two cases of diphtheria the antra were always involved. Out of fifteen severe cases the *B. diphtheriæ* was present in twelve, in two alone, in three with the diplococcus lanceolatus, in one with the streptococcus pyogenes, in one with the diplococcus lanceolatus and the streptococcus pyogenes, in two with the staphylococcus pyogenes aureus, and in three with the staphylococcus and streptococcus together.

In the seven remaining cases (catarrhal) the *B. diphtheriæ* was always absent. There were found in one case the diplococcus lanceolatus alone, in one case the diplococcus lanceolatus and the staphylococcus pyogenes aureus, in two cases the streptococcus pyogenes alone, in one case the streptococcus pyogenes and the staphylococcus pyogenes flavus, and in one case the staphylococcus pyogenes aureus and the *B. pyocyaneus*.

In the five cases of measles cultures were made in three, in two of which the diplococcus lanceolatus and the streptococcus were found together, and in the other case the staphylococcus (variety?) was found.

In the one case of scarlatina cultures showed the streptococcus, the staphylococcus pyogenes aureus, and the *B. pyocyaneus*.

E. Fränkel in the cases already alluded to found in the exudations from forty antra the diplococcus lanceolatus twenty-two times—eight

times alone. This organism was found in association with the staphylococcus pyogenes flavus and citreus, the streptococcus pyogenes, the B. mucosus capsulatus, and in two cases with the B. fluorescens liquefaciens putridus.

The staphylococcus pyogenes flavus was commonly found, but only once alone. The streptococcus pyogenes appeared alone in two cases. In all, the streptococcus was found seven times, the staphylococcus pyogenes flavus fifteen times, in three cases these last two organisms being together. The B. mucosus capsulatus was found alone in two cases, and in one with the staphylococcus pyogenes aureus and the diplococcus lanceolatus, in one case with the diplococcus lanceolatus alone, and in one case with the pseudo-diphtheria bacillus.

The B. pseudo-diphtheriæ was found in four cases, in one case with the B. mucosus capsulatus, in one with the aureus, in one with the diplococcus lanceolatus and B. fluorescens liquefaciens foetidus, and in one with the diplococcus lanceolatus alone.

The influenza bacillus was present in one case with the aureus.

The staphylococcus pyogenes citreus was found once with the diplococcus lanceolatus.

The diplococcus foetidus crassus was met with twice, each time with the diplococcus lanceolatus. In two cases the B. coli communis was found, both cases being severe peritoneal infections with strangulated hernia. The antra were filled with bloody serum.

In Fränkel's cases the diplococcus lanceolatus was the organism most commonly found, with the staphylococcus second, the streptococcus third, and the B. mucosus capsulatus fourth in frequency.

H. L. Wagner in 1896 reports finding the staphylococcus pyogenes aureus in the antrum in a case of antral empyema with lead poisoning.

Cases of syphilis of the antrum have been described by Lewin, Luc, Combe, Hermet, Dmochowski, and ourselves. Dmochowski quotes Kilian, Weichselbaum, and Grünwald as describing antral tuberculosis, but always as a secondary invasion from the nose or superior maxilla. In an individual dead of lung tuberculosis Dmochowski found in one antrum a few drops of muco-pus in which there were a number of tubercle bacilli.

Zarniko and J. N. Mackenzie have each reported a case of antral empyema due to the aspergillus fumigatus.

In our list there are fifteen cases of antral disease with a total of seventeen antra. The right antrum was involved in five cases (VII., X., XI., XVII., XVIII.); in three alone, in one with the ethmoidal sinuses (VII.), and in one case with the frontal and ethmoidal sinuses (XVII.). The left antrum was affected eight times alone (I., II., III., IV., VIII., IX., XIII., XVI.). Both antra were affected in two cases (VI. and XIV.), and in each of these the ethmoidal sinuses were involved. In

three cases the disease was acute (IV., VII., XII.); two following influenza (IV. and VII.); and the other a severe coryza; in the first case the streptococcus pyogenes was found in pure culture, in the second the influenza bacillus and the staphylococcus pyogenes aureus; in the third the diplococcus lanceolatus and the pseudo-diphtheria bacillus were present. Of the twelve chronic cases two followed influenza (I., XIII.), and in the first there was hypertrophy of the inferior turbinal of the affected side, and the antral process, in which was found the streptococcus pyogenes, was complicated by facial erysipelas and a fatal septicæmia. At the autopsy on the case a polypus was found in the affected antrum, and the walls of the sinuses were covered with a thick fibrino-purulent exudation. In the second case the nose was normal, and cultures gave the bacillus mucosus capsulatus. In Case II. the primary infection was syphilis (syphilitic ulceration of the alveolar and palatal processes of the superior maxilla), with a secondary mixed infection of the antrum with the streptococcus pyogenes, the staphylococcus pyogenes aureus, and the bacillus mucosus capsulatus.

In Case XVII., in which the frontal and ethmoidal sinuses were involved with the right antrum, the process followed a coryza succeeding exposure after pneumonia. In cultures from the antrum the streptococcus pyogenes and the staphylococcus pyogenes aureus were found.

In Case XVIII. the *atrium infectionis* was apparently through a decayed bicuspid tooth. There is no record of the condition of the nose. The diplococcus lanceolatus was found in pure culture. In Case VIII. there were tenderness and swelling about the first and second bicuspids of the affected side, but the teeth themselves appeared sound. There was hypertrophy of the left inferior and middle turbinates. Cultures showed the staphylococcus pyogenes albus and a thread fungus which was not pathogenic for rabbits or guinea-pigs. In Case XVI. there were pain and swelling about the second left bicuspid tooth, which was badly decayed and connected with an abscess of the alveolar process. The streptococcus pyogenes and the staphylococcus pyogenes aureus were found.

In Cases IX. and X. there was atrophic rhinitis. The first case, IX., was a neurasthenic with severe anæmia. The cultures gave the staphylococcus pyogenes albus and an unidentified, non-pathogenic bacillus. In Case VI., with bilateral antral empyema of many years' duration, all the upper teeth had been lost, and the nares were filled with polypi, and a large polypus filled the naso-pharynx. From the right antrum the streptococcus pyogenes was obtained, and in the left the streptococcus pyogenes and the bacillus mucosus capsulatus were found. In the remaining cases there was no history of antecedent disease. To sum up: of the chronic cases, three followed acute infectious diseases (influenza, coryza, and pneumonia); one was due to syphilis, two were

clearly, and one other possibly, secondary to dental caries; two were associated with atrophic rhinitis; three had nasal polypi, and in three cases there was hypertrophy of the turbinals.

In the seventeen antra examined the streptococcus pyogenes was found in eleven, five times alone, four times with the staphylococcus pyogenes aureus, once with the bacillus mucosus capsulatus¹ alone, and once with the diplococcus lanceolatus and the bacillus mucosus capsulatus. The staphylococcus pyogenes aureus was never found alone, but with the streptococcus pyogenes four times (III., X., XVI., XVII.), and with the influenza bacillus once (VIII.). The bacillus mucosus capsulatus was found alone in one case (XIII.), with the streptococcus in one case (left antrum of Case VI.), and with the diplococcus lanceolatus and the streptococcus pyogenes in one case (II.).

The diplococcus lanceolatus occurred alone in one case (XVIII.), once with the pseudo-diphtheria bacillus (II.), and once with the streptococcus pyogenes and the bacillus mucosus capsulatus (VI.). The staphylococcus pyogenes albus was found once with an unidentified, non-pathogenic bacillus (XVI.).

CHARACTER OF THE ANTRAL EXUDATES. In eleven of our cases in which it is recorded, the antral exudate was muco-purulent in four, very viscid muco-purulent in two, thin watery or serous in one case, and purulent in four cases. In all cases epithelial cells were found. They varied in size and shape, and no columnar or ciliated cells were seen.

The epithelial cells present were usually large, swollen, flat, sometimes round, and sometimes ovoid. They had oval or round vesicular nuclei, with finely granular protoplasm. Some of the cells were markedly swollen, and some typical goblet cells were seen. In many cases these cells contained large or small fat drops. Many cells, especially in distinctly purulent discharges, were in various stages of degeneration. In some instances free and fragmented nuclei were found.

The polymorphous nuclear leucocytes varied greatly in number, from comparatively few in some of the muco-purulent cases to great numbers in the purulent ones.

¹ The term "bacillus mucosus capsulatus" is meant to include a group of capsulated bacilli (of which the bacillus of Friedländer is the type) which are pleomorphic, rather large, non-motile, usually decolorizing by Gram's staining method, giving a luxurious mucus-like growth on solid media, with a nail-shaped growth, without liquefaction in gelatine stab cultures, and which are pathogenic for the ordinary laboratory animals, notably mice. The different examples of this group vary to a considerable degree. We are inclined to think with Fricke, that many of the capsule bacilli described in a variety of lesions belong to this group. One of us (Howard) has met with a number of examples of such organisms, which, while answering in many ways to the classical description of the bacilli of Friedländer, show several important points of difference. The main differences consist in the varying amount of gas and acid production in the coagulation of milk, and the widely varying results of animal inoculation. See Fricke: "Über den sogenannten bacillus mucosus capsulatus," Zeitschrift f. Hygiene und Infektionskrankh., Bd. xxiii, S. 330.

In several cases large mononuclear cells, not epithelial in type, with a large nucleus surrounded by a comparatively large rim of protoplasm, were seen. The nuclei of these cells stained deeply. It is difficult to determine whether these cells were derived from the fixed cells of the past, or whether they were leucocytes. They always formed a small proportion of the cells present.

Red blood-cells were seen in a few cases.

Fibrin was made out in the exudation of several of the purulent exudates. Bacteria were found in cover-slip preparations in every case examined. In nearly every case they were inside of cells as well as free in the exudate.

The epithelial cells and the polymorphous nuclear leucocytes were the phagocytes in every instance.

In the following case the antra were examined at autopsy:

CASE I.—K. P., aged thirty-three years. Six months before coming under observation he had an attack of influenza which lasted for two weeks. At this time there was considerable discharge from the nose, especially from the left side. The hard palate on the left side was swollen and painful at the same time. Two weeks later an abscess formed about the palatal border of the alveolar process of the superior maxilla opposite the second bicuspid tooth on the left side. In a short time this abscess ruptured spontaneously into the mouth. This condition was present when the patient came under observation. The right nasal fossa was comparatively normal; the left was partially filled with crusts and pus, and the inferior turbinal was hypertrophied. An exploratory puncture was made into the left antrum and 9 c.c. of thick, foul-smelling pus were obtained. Cover-slip preparations of this pus showed polymorphous nuclear leucocytes, large flat epithelial cells, fibrin, and large numbers of streptococci.

The man later developed erysipelas of the left side of the face and died with general septicæmia.

The mucous membrane of the left antrum was thickened, deeply congested, and edematous. The mucous membrane of the floor of the antrum was of a dark red color.

At the angle formed by the posterior and superior walls of the antrum, and midway between the lateral walls, there was a soft pear-shaped polypus measuring 8 by 20 mm. Examination of the other accessory cavities and of the nose was negative.

Sections made from various portions of the wall of the left antrum showed nearly everywhere the same appearance. The epithelial cells of the surface were lost in places; in many places they were swollen, very granular, and often vacuolated. Their nuclei stained poorly. There was no exudation on the surface of the mucous membrane. The greatest changes were seen in the submucous layer, while in nearly all the sections examined there was marked round-cell infiltration, most of the cells having single round or oval nuclei, but some were seen with polymorphous nuclei. In the tissues there were many spindle-shaped cells. There were a large number of newly-formed bloodvessels which, with the other vessels of the part, were distended with blood. Here and there were areas of hemorrhage into the tissue. The intercellular

spaces were widened and filled with serum. The glands, as a rule, showed little change; but many of the gland-duets were dilated and tortuous. In most places the essential change consisted in the formation of granulation tissue in the submucous layer. In sections stained by Weigert's method streptococci were seen in this tissue. Sections made through the polypus showed, in the main, the same changes in the tissues described in the mucous membrane above.

The glands were apparently increased in number and dilated, while the fibrous tissue in the deeper layers was much increased in thickness.

THE FRONTAL SINUSES. Most of the literature concerning the relation of infectious processes to the etiology of frontal sinus inflammation has been given already.

Betheze describes a case occurring in acute articular rheumatism. Kuhnt found cases secondary to syphilis, septic infection, influenza, smallpox, measles, scarlatina, rheumatism, and acute and chronic rhinitis. Besides these, he mentions typhoid, erysipelas, glanders, and gonorrhœa as causes.

Trauma is not uncommonly a cause. Delasiuave found a mass of larvæ in the nose of a girl with frontal sinus empyema, and in the case of a woman he found larvæ in the sinuses.

Ricoux found seventy-two worms in the frontal sinuses of an individual who drank water from a sheep trough. Von Dochmeine found anchylostomum duodenale in the frontal sinuses of a St. Gothard tunnel worker.

Chronic rhinitis and nasal tumors are cited as common causes.

In Wolff's series of cases of diphtheria, scarlatina, and measles the frontal sinuses were involved once only, in a case of diphtheria.

Of Fränkel's six cases three occurred in pneumonia, one in a case of incarcerated hernia, one in phthisis, and one in a case of hypertrophic liver cirrhosis. Von Besser in one case of frontal sinus inflammation found the *B. of Friedländer* and the streptococcus pyogenes.

Sebrazès has reported a case due to diplococcus lanceolatus. In one case he found a non-motile bacillus which stained by Gram, liquefied gelatine, and caused abscesses in rabbits.

In Wolff's case following diphtheria, with inflammatory œdema, he found the *B. diphtheriæ* and the staphylococcus pyogenes aureus in the exudate.

One of Fränkel's six cases was sterile; of the other five, there were found in one the diplococcus lanceolatus, in two the diplococcus lanceolatus and *B. coli communis*, in one the staphylococcus pyogenes flavus, and in the last case the streptococcus pyogenes.

Berger obtained the streptococcus pyogenes in one case. Kuhnt found in two cases the diplococcus lanceolatus, and in one case occurring in a diabetic an unidentified bacillus.

We have not been able to find in the literature cases of croupous or

diphtheritic inflammation, or of gonorrhœa, glanders, tuberculosis, or actinomycosis of these sinuses. Kuhn reports cases of an undoubted syphilis of these sinuses.

In three of our cases the frontal sinuses were affected alone, the right sinus twice (V. and XII.), and left once (XV.).

Both sinuses were involved in two cases.

Both frontal sinuses were affected with the ethmoidal and the maxillary sinuses in two cases (XIV. and XVII.). Two cases followed acute coryza. Cultures from the frontal sinuses showed in one case (V.) the staphylococcus pyogenes aureus; in the second case (XII.) the diplococcus lanceolatus; in the third case (XIV.) the streptococcus pyogenes; in the fourth case (XV.) the staphylococcus pyogenes aureus; and in the fifth case (XVII.) the streptococcus pyogenes and the staphylococcus pyogenes aureus.

Thus the staphylococcus pyogenes aureus occurred three times, the streptococcus twice, the diplococcus lanceolatus once, the *B. mucosus capsulatus* once, and an unidentified, non-pathogenic bacillus (with the aureus) once.

All the frontal sinus exudations studied by us were purulent, except one (XIV), in which the discharge was muco-purulent. In this case polymorphous nuclear leucocytes, large, swollen, and often fatty epithelial cells were seen in the discharge from the antra, as well as from the frontal sinuses.

Columnar ciliated cells were never present. The epithelial cells seen were always swollen, often round or oval, with finely granular protoplasm, and often contained larger or smaller fat droplets.

The material brought away from the frontal sinuses of Case XIV. by the curette contained, besides the portions of the mucous membrane, a number of larger and smaller polypi. The portions of mucous membrane showed on section swelling and desquamation of the epithelial cells. In the underlying tissues there was an increase of cells with œdema and marked congestion. Scattered here and there in the tissues, lying in the intercellular spaces, as well as in many of the cells, there were larger and smaller masses of yellowish or orange-colored pigment. There was no leucocytic infiltration.

The polypi varied very much in size; some had broad, while others had narrow bases. They all showed the same structure, being made up of a loose fibrous tissue meshwork, rich in nuclei. The spaces of this tissue were large and filled with fluid (œdema) and a few lymph corpuscles. In some places there was a round-cell infiltration. The bloodvessels were markedly congested. Scattered here and there were a number of pigment granules. The surface epithelium cells were swollen and granular, and many goblet-cells were seen. The free margins of the growths were very irregular in outline.

SPHENOIDAL SINUSES. In the literature a number of cases of inflammation of these sinuses are to be found. It is usually met with in association with inflammation of the antra and frontal sinuses.

Zuckermandl describes injection and ecchymosis of the mucous membrane, with great swelling and serous infiltration in catarrhal processes, and the filling of the cavities with mucopurulent, or purulent, or even blood-stained material in purulent inflammations.

The cases of Weichselbaum have already been referred to.

Siebenmann found empyema of the sphenoidal sinuses in three individuals dead of typhoid fever.

Sebražès reports finding in cases of empyema of the sphenoidal sinuses the *staphylococcus pyogenes aureus* and the *B. foetidus* found by Hajek in chronic rhinitis.

In Wolff's series there were seven cases of sphenoidal inflammation.

In two cases the oedematous mucous membrane was covered with a fibrinous false membrane. The *B. diphtheriæ* was found six times, three times alone, and in one case each with the *diplococcus lanceolatus*, the *streptococcus*, and the *staphylococcus pyogenes aureus*.

In one case the *streptococcus pyogenes* and the *staphylococcus pyogenes flavus* were found without the *B. diphtheriæ*.

In the five cases of measles examined the sphenoidal sinuses were intact and bacteria free.

In two cases of scarlatina one showed marked inflammatory oedema of the sphenoidal sinuses (no record of cultures), and in the second case these sinuses were unchanged, and cultures from them remained sterile. In Fränkel's experience the sphenoidal sinuses were affected next in frequency to the maxillary. In twenty-one cases bacterial examinations were made, and in four cover-slip preparations were studied.

In eight cases the sphenoidal sinuses were affected alone, and in thirteen cases one or more of the other sinuses were also affected.

In one case there was a cyst of the sinus-wall, without fluid in the cavity.

In the other cases, in some there was fluid in the cavities, both with and without changes in the walls, while in other cases there were mural changes without exudation into the cavities. In the first category there were thirteen cases.

The character and the quantity of the fluid varied. Usually there were a few drops of serous or mucous, sometimes hemorrhagic, material. In other cases it was purulent. In one case there were small balls of mucus with a clear serous exudate, and in another case the exudate was of a chocolate color.

Of the eight remaining cases, three showed changes only in the sinus walls; one oedema, one thickening and fresh hemorrhage, and one swelling and redness of the mucosa, with a fibrinous false membrane. The

other five cases showed exudation into the cavities, in addition to the changes in the walls. In one the mucous membrane was red, turbid, and swollen, and in the cavity there was cloudy fluid with clots.

In two others there were cloudy serous exudates, with cedema of the walls, and in the last case there was a thin purulent exudate with cedema of the roof of the sinus.

Cover-slip preparations which were made in five cases showed epithelial cells and a varying number of mono- or polymorphous nuclear leucocytes, with a few bacteria.

In four cases sections of the walls of the sinuses were studied microscopically. The surface epithelium was always preserved. The connective-tissue fibres were pressed apart by cedema. The glands were normal. The bloodvessels showed no changes, except in one case an artery contained a fibrinous thrombus.

In one of the cases the mucous membrane showed extensive round-cell infiltration, with masses of fibrin in the vessels, and in sections stained by Weigert's method large numbers of the diplococcus lanceolatus. This organism was found in over two-thirds of the cases, and the lesions varied very much.

The staphylococcus pyogenes flavus was present six times: in pure culture in two cases, with the diplococcus lanceolatus in two cases, with the diplococcus lanceolatus and the streptococcus pyogenes in one case, and with the *B. influenzae* in one case.

The *B. mucosus capsulatus*, the *B. influenzae*, and the streptococcus pyogenes were each met with twice; the *B. influenzae* in one case with the *B. pseudo-diphtheriae*, and in another case with the staphylococcus pyogenes flavus, and in the remaining two cases with the diplococcus lanceolatus.

Fränkel reports two cases in which the sphenoidal sinuses showed changes, with the presence of micro-organisms.

In the first case there was a stringy fluid in the sinuses in an individual with necrotic cholecystitis, and in the second case there was a purulent exudation in the antra and a small quantity of mucus in the cavity, with swelling and icteric discoloration of the walls of the sphenoidal sinuses in a man with cirrhosis of the liver.

Fränkel found six cases of sphenoidal sinus inflammation in acute pneumonia, and in five of these (in three in pure culture) the diplococcus lanceolatus was found in the sinus exudate.

These sinuses were affected in three of five cases of cerebro-spinal meningitis. In one case there was marked fibrinous inflammation of the mucous membrane, with the diplococcus lanceolatus; in another case both sinuses contained a cloudy exudate, with the diplococcus lanceolatus and streptococcus pyogenes; and in the last case there was a thin, purulent fluid with the *B. influenzae* and the *B. pseudo-diphtheriae*.

In the case of variola, previously mentioned, there was a purulent exudate in the sphenoidal sinuses, with the *diplococcus lancolatus*, the *streptococcus pyogenes*, and the *staphylococcus pyogenes flavus*.

Of the remaining cases, four occurred in phthisis, and three in suppurative processes, viz., peritonitis, putrid bronchitis, and sacral caries. In only one case was there severe chronic nasal disease—atrophic rhinitis. As previously stated, we had not had an opportunity of examining material from the sphenoidal sinuses.

ETHMOIDAL SINUSES. In this list of cases we have not found these sinuses affected alone.

In Case VI. both antra and the frontal sinuses were affected with the ethmoidal, and in the material from the latter the *streptococcus pyogenes* was found.

In Case XIV. the ethmoidal sinuses were again affected with both antra, and the *streptococcus pyogenes* was present in the scrapings.

In Case VII. the ethmoidal inflammation was associated with empyema of the right antrum following influenza, and the *staphylococcus pyogenes aureus* and the *B. influenzae* were found in the pus.

In Case XVII., with both antra and frontal sinuses affected, the *staphylococcus pyogenes aureus* and the *B. pyocyaneus* were present in the material from the ethmoidal sinuses.

Thus, in the four cases the *streptococcus pyogenes* occurred alone in two, the *staphylococcus pyogenes aureus* in both the remaining cases, once with the *B. influenzae* and once with the *B. pyocyaneus*.

Little has been added to the pathological anatomy of the ethmoidal sinuses since the papers of Grünwald and Woakes. Wolff and Fränkel do not mention the examination of the ethmoidal sinuses in their cases.

Sections made from a number of small pieces of tissue removed by curettage from the ethmoidal sinuses of Case XIV. showed distinct changes in the mucous membrane. Many of the cells of the surface epithelium were swollen and granular, and many goblet-cells were seen. In addition to the columnar cells, only a few of which showed cilia, round, cuboidal, and some flat epithelial cells were seen. Scattered among these there were a few polymorphous nuclear leucocytes. The subepithelial tissue was œdematous and the bloodvessels were congested.

CONCLUSIONS. It is seen, then, from the foregoing facts, that acute and chronic inflammations of the accessory sinuses of the nose are not caused by a single micro-organism, nor even by a single group of micro-organisms.

It is, however, demonstrated that with a few exceptions (*aspergilli* and *vermes*) inflammations of these cavities are caused by bacteria.

The bacteria found, as would be expected, are those that are commonly present in the buccal and nasal cavities; in the former in health,

and in the latter occasionally in health, and usually in disease, such as acute and chronic rhinitis (both atrophic and hypertrophic), nasal tumors, and the like. While these organisms are the most frequent invaders of these sinuses, there are a number of cases in which certain bacteria less commonly present in suppurative processes have been found.

It is interesting to recognize that the common agents in the causation of inflammations of other parts of the air-passages (the diplococcus lancolatus, the pyogenic staphylococci and streptococci, the bacilli of the group of Friedländer's bacillus (*B. mucosus capsulatus*), the *B. diphtheriæ*, and the *B. influenzae*) are the most important and the usual micro-organisms found in inflammatory processes of these adjuncts to the respiratory system.

The relation of the infectious diseases, both local and general, to these inflammations is of great importance.

There are two groups of these cases, the first, in which the accessory sinuses are invaded by a direct extension of the inflammatory process, as in acute and chronic rhinitis, coryza, influenza, diphtheria, pharyngitis, tonsillitis, tuberculosis, syphilis, nasal tumors, erysipelas, and injuries; and, second, those cases in which parts of the body remote from the sinuses are primarily affected, as in erysipelas, articular rheumatism, pneumonia, phthisis, meningitis, and suppurations in general, or diseases in which the whole system is involved, as measles and scarlatina; in all of which the normal resistance of the sinuses is so lowered that bacteria which reach them from distant parts by means of the blood, or from neighboring parts by the spreading of inflammatory processes, set up inflammation.

Fränkel is the first to suggest that inflammatory processes of distant parts of the body may be the sources from which micro-organisms may reach the accessory sinuses by means of the blood. Some of his cases strongly support this view.

The finding by Fränkel of inflammation of these sinuses in individuals suffering with chronic diseases such as nephritis, arterio-sclerosis, and lung tuberculosis, which are now proverbially known so to lower the general resistance as to favor secondary infections, is of special interest. Cases may also be cited to show that inflammations primary in the accessory sinuses may be the starting point for infectious processes in other parts, not only by spreading of the process by continuity, but by distant metastases by means of the circulation.

CASE II.—R. B., male, aged twenty-six years, colored. Had a chancre six years ago. For the past two years he has had trouble with his nose, but gives no history of an acute infection, such as influenza. One year and a half ago all the bicuspid teeth in the left superior maxilla became sore and loose, and one (from his description, probably the second bicuspid) was extracted. Small spiculae of bone were cast off from the alveolar process, and about two weeks later he noticed

that he could suck pus into his mouth from the left antrum through the alveolus from which the tooth had been removed. Necrotic bone continued to be cast off from the left alveolar process, and all the bicuspid teeth dropped out. About this time he noticed a small perforation (syphilitic) in the hard palate, in the median line, which increased in size from before backward, so that now it is about 3 cm. long. Six months ago, he says, the fistula from the mouth into the left antrum was curetted and healed, so that the discharge of pus into the mouth ceased, while that from the nose increased. When the patient was first seen there was considerable swelling below the left eye, extending well down over the cheek, with severe pain on this side. A little pus was oozing from both puncta lachrymalia of the left eye, and the left nasal fossa contained crusts and pus. About 8 c.c. of thick pus were obtained from the left antrum by exploratory puncture. The antrum was then opened through the inferior meatus and treated daily, and the patient given antisyphilitic treatment. Frequently, in washing out the antrum, a little water would flow out through the lachrymal puncta, showing that there was a direct communication with the antrum. In this case the perforation in the palate was evidently of syphilitic origin, and the antral disease must, without doubt, be attributed primarily to the same cause. Under the combined antisyphilitic and local treatment of the antrum, the patient improved. Microscopical examination of the pus obtained by aspiration showed three kinds of cells—large, flat epithelial cells, with large round vesicular nuclei; polymorphous nuclear leucocytes, and some degenerated cells without nuclei. In unstained preparations they were seen to contain large and small fat-droplets. In these cells in stained preparations and in some of the leucocytes micrococci were seen. Three varieties of micro-organisms appeared in stained preparations: the most numerous were streptococci in short chains; capsulated diplococci; and short bacilli, often lying in pairs side by side. In cultures all three forms grew. The streptococcus and the capsulated diplococcus were pathogenic for young rabbits, and were identified respectively as the streptococcus pyogenes and the diplococcus lanceolatus. The bacillus was pathogenic for guinea-pigs, and was of the Fränkeler bacillus group (*B. mucosus capsulatus*).

CASE III.—C. H., male, aged thirty-nine years, gave a history of having had polypi removed from the left nasal fossa at various times during the past sixteen years. His teeth were all in good condition. There was considerable hypertrophy of the right inferior turbinal. The left fossa was completely occluded by polypi, which were covered with a purulent secretion. The polypi were all removed, and the nose was sprayed daily with dilute alcohol for three weeks. The purulent discharge continued in the left fossa. When the nose was cleansed and cocaineized, and the head placed in Fränkel's position, a few drops of pus would invariably appear in the middle meatus (left fossa) just above the middle third of the inferior turbinal. Exploratory puncture of the left antrum was advised, but refused; so the nasal fossa was thoroughly washed with a 1:1000 bichloride solution, and cultures made from the pus obtained with the head in Fränkel's position. Probing in the region of the other cavities gave negative results. Of course, one cannot say positively that this was a case of antral empyema, and yet there can be but little doubt that such was the condition; for three months later, when the patient was last seen, the purulent discharge

was still present in the left middle meatus, and there was some tenderness over the left antrum. The pus showed on microscopical examination a few large, flat, swollen epithelial cells, some polymorphous nuclear leucocytes, and a large number of streptococci in long chains, and a few diplococci. Cultures gave both the streptococcus pyogenes and the staphylococcus pyogenes aureus, the latter organism being pathogenic for rabbits.

CASE IV.—G. S., male, aged forty-three years. Three weeks ago he had an attack of influenza, and one week later he noticed a purulent discharge from the left nostril, which has continued ever since. The right fossa is normal; in the left there is an abundance of creamy pus. There is some tenderness on the left side of the face. The second bicuspid had been removed several years ago, otherwise the teeth on the left side were good. The diagnosis of acute maxillary empyema secondary to influenza was made, and about 8 c.c. of creamy pus were obtained from the left antrum by exploratory puncture. During the following two weeks the left antrum was washed four times by means of a small trocar passed through the inferior meatus; the discharge had then ceased entirely.

Microscopical examination of the pus showed a large number of polymorphous nuclear leucocytes, some small round mononuclear cells, and some large flat cells with granular protoplasm and round vesicular nuclei, and large numbers of streptococci in long chains. The streptococcus proved to be the streptococcus pyogenes.

CASE V.—F. V., male, aged seventy-six years. Twenty years ago he had a severe eoryza, accompanied by intense frontal headache, which was most marked on the right side. After a few days the right frontal sinus ruptured spontaneously externally. At present there is a small fistulous opening about midway between the supraorbital notch and the internal canthus of the right eye, leading directly into the right frontal sinus. Creamy pus oozes from this opening continuously. There is no purulent discharge in the nose: the right middle turbinal is hypertrophied at its anterior end, and the septum deviates slightly to the right, otherwise the nose is normal. A small canula was inserted into the frontal sinus through the external opening, and about 3 c.c. of pus were washed out. All further treatment was refused by the patient.

Cover-slips showed polymorphous nuclear leucocytes; some large epithelial cells and diplococci. Cultures showed the staphylococcus pyogenes aureus, and a bacillus which shows a raised, grayish-white growth and turns agar brown. This bacillus is not pathogenic for guinea-pigs or rabbits.

CASE VI.—M. W., female, aged forty-two years. About twenty-two years ago she first noticed a purulent discharge from the left nostril, and about ten years later a purulent discharge on the right side. At this time she had all the upper teeth extracted and a plate made. Both nasal fossæ became occluded, the sense of smell was lost, and tinnitus aurium was constant. About five years ago she had otitis media acuta sinistra. Examination showed both nasal fossæ filled with polypi, which were covered with pus. One large polypus filled the nasopharynx. The polypi were all removed, and hypertrophies of the middle and inferior turbinal on both sides reduced. There was a profuse purulent discharge in both fossæ. Exploratory puncture, first of the left antrum, then of the right, was made, and about 7 c.c. of thick,

ill-smelling pus were obtained from each antrum. Both antri were then opened through the alveolar process, and aluminum tubes were made and inserted by Dr. J. F. Stephan, her dentist. The anterior end of the left middle turbinal was then removed, and about 4 c.c. of foul, thick, almost caseous pus were washed out of the left frontal sinus. The anterior ethmoidal cells on this side, which were also involved, were eurented, and then the posterior cells. The same treatment was then applied to the right side, and at present the left sphenoidal cavity is being attacked. The antra, frontal and ethmoidal sinuses are slowly improving under washing with hydrogen dioxide.

Right antrum. The pus contained, besides numbers of polymorphous nuclear leucocytes, some small round cells with round nuelei, and larger round mononuclear cells with vesicular nuelei and granular protoplasm; some of the polymorphous nuclear leucocytes contained cocci. Streptococci were present in long chains in great numbers. Cultures showed streptococcus pyogenes longus in pure culture. This organism was pathogenic for young rabbits.

Left antrum. Cover-slips from the pus showed polymorphous nuclear leucocytes, large cuboidal cells with vesicular nuelei, granular protoplasm and often fat-drops, fibrin and streptococci, and a few bacilli.

The streptococci grew in long chains and was pathogenic for young rabbits; the bacillus was identical with that of Case II. (the *B. mucosus capsulatus*).

CASE VII.—D. M., female, aged fifty years. One month ago she had an attack of influenza followed in a few days by a purulent discharge from the right nostril, which has continued. The left nasal fossa is normal; the right fossa contains creamy pus, particularly in the middle meatus. The teeth in the upper jaw are all good. The right antrum was punctured and about 6 c.c. of pus were obtained. A permanent opening into the right antrum was then made through the inferior meatus. The anterior ethmoidal cells were also involved, and the floor of the cells was removed with a curette. Irrigation of the antrum and ethmoidal cells with hydrogen dioxide (20 per cent.) was continued for ten weeks, at the end of which time the discharge ceased.

Pus from right antrum contained polymorphous nuclear leucocytes, cuboidal and columnar epithelial cells, and large numbers of diplococci and some bacilli. Cultures showed the staphylococcus pyogenes aureus, which was pathogenic for rabbits, and the influenza bacillus. The same organisms were found in the material obtained from the ethmoidal cells.

Sections made of a number of small pieces of tissue removed by curettage from the ethmoidal sinuses showed distinct changes in the mucous membrane. On examination of the surface epithelium many of the cells were granular and swollen, and numerous goblet-cells were seen. In addition to the columnar cells, few of which showed cilia, there were round, cuboidal, and even flat epithelial cells. Among these cells there were a few polymorphous nuclear leucocytes. The tissue beneath the epithelial layer was markedly oedematous, and the bloodvessels were distended. Here and there in the tissue polymorphous nuclear leucocytes were seen.

CASE VIII.—L. W., female, aged twenty-two years. She has had a purulent discharge from the left nostril for one year, with some infiltration and pain around the first and second bicuspid teeth on the left

side. The right nasal fossa was normal; in the left, the inferior and middle turbinals were somewhat hypertrophied and covered with pus. About 6 c.c. of creamy pus were obtained from the left antrum by puncture. The first and second bicuspid teeth were then removed; the fangs of both teeth were decayed. The antrum was then drilled into through the alveolus and an aluminum tube inserted and the cavity treated daily. A slight discharge still persists.

Cultures made from the pus at the time of the operation showed the *staphylococcus pyogenes albus* and an abundant growth of fungus, a grayish-white raised growth, with a porcelain-like surface and serrated margins. Cover-slip preparations showed short bacilli, and larger and shorter filaments, which vary greatly in thickness, and in length from 10 to 50 mm. There is sometimes a network from which long filaments radiate. Some of the long filaments are bent into S-shaped and circular forms. This organism was not pathogenic for animals.

CASE IX.—M. D., female, aged seventeen years, neurasthenic and anemic. Her nose has troubled her for years, but during the past month she has had a purulent discharge from the left nostril. There is no history of an acute infection. Examination of the nose shows considerable atrophy of both inferior and middle turbinals, with some accumulation of crusts and the usual odor. There is an abundance of pus in the left fossa. Her teeth are good. Four days after the patient was first seen she had an attack of otitis media acuta sinistra, which recovered under treatment in five days. One week later the left antrum was punctured and 5 c.c. of pus were obtained. Constitutional treatment was given and the atrophic rhinitis treated. During the following week the antrum was thoroughly washed out twice and the discharge ceased. A thick gelatinous pus was obtained from the antrum, which, on microscopical examination, showed a large number of polymorphous nuclear leucocytes, diplococci, and some short thin bacilli. Cultures showed only the *staphylococcus pyogenes albus*; the bacillus failed to grow.

CASE X.—M. O'M., female, aged twenty-three years. She has had an atrophic rhinitis since childhood, and during the past three months there has been a continuous purulent discharge from the right nostril. An attempt made at an exploratory puncture failed on account of thickness of the antral wall. Pus was obtained as in Case III. after cleansing the nose with a 1:1000 bichloride solution. The patient refused further operation, and when last seen, four months later, the purulent discharge still continued in the right nostril.

Cover-slip preparations from the pus showed polymorphous nuclear leucocytes, cuboidal epithelial cells, streptococci, and diplococci. Cultures showed the *streptococcus pyogenes* and the *staphylococcus pyogenes aureus*.

CASE XI.—R. W., female, aged fourteen years. Two weeks ago she had an acute coryza which improved in a few days, but a purulent discharge from the right nostril has persisted. There is considerable hypertrophy of both inferior turbinals, and an abundant purulent discharge from the right nasal fossa; 5 c.c. of pus were obtained from the right antrum by puncture, and the cavity thoroughly washed. After washing the antrum the purulent discharge gradually decreased, and at the end of five weeks it had entirely disappeared.

The material from the antrum was thick, viscid, muco-purulent in character. Cover-slip preparations showed a large number of polymor-

phous nuclear leucocytes, and some large, flat, swollen polygonal epithelial cells with vesicular nuclei and granular protoplasm, often containing fat drops. In the pus were large numbers of lanceolate diplococci and some bacilli about the size of the bacillus diphtheriæ. Cultures showed the diplococcus lancolatus and a bacillus which had many of the morphological and cultural characters of the bacillus diphtheriæ, but which was not pathogenic for animals.

CASE XII.—H. Z., female, aged eleven years. About a year and a half ago she had a severe coryza, and since then has had continually a purulent discharge from the right nostril, accompanied by frontal headache, particularly on the right side. At times the discharge from the nose has decreased for two or three days, and at such times the headache has always been more severe. The left nostril is normal; the right inferior turbinal is hypertrophied. Pus is present in the anterior part of the right nasal fossa. Fränkel's position gives negative results as to the right antrum. The right frontal sinus was probed through the nose at three different times, and the withdrawal of the probe was always followed by the flow of a few drops of pus. All operative interference was refused by the mother.

Cover-slip preparations of the muco-purulent material obtained from the frontal sinus showed a few polymorphous nuclear leucocytes, a number of large, flat cells with a single vesicular nucleus, and granular, and often fatty, protoplasm, and lanceolate diplococci in capsules. The organism failed to grow in cultures.

CASE XIII.—A. G., female, aged thirty-five years. Six months ago she had an attack of influenza, followed by a continuous purulent discharge from the left nostril. Dr. Wenner made an exploratory puncture into the left antrum and obtained thick, creamy pus. He then treated the antrum through a tube inserted through the inferior meatus.

Microscopical examination of the pus showed many polymorphous nuclear leucocytes, a large number of large flat cells with single vesicular nuclei and granular protoplasm, some smaller round cells, and cuboidal cells with the same type of nucleus. A few diplococci and bacilli in capsules were seen. Cultures showed a pleomorphic capsulated bacillus, pathogenic for guinea-pigs, and, apparently, identical with Friedländer's bacillus (bacillus mucosus capsulatus).

CASE XIV.—H. B., female, aged forty-five years. Both antra were punctured by Dr. Wenner and pus obtained from each. The anterior ethmoidal cells, which were also involved, were everted. Later he operated on the left frontal sinus externally and found it full of pus. The right frontal was then operated upon the same way, and contained pus and polypi. Pus was obtained several times from the various cavities, antra, frontal, and ethmoidal sinuses. Cover-slips showed polymorphous nuclear leucocytes, large swollen, and often fatty, epithelial cells, and always streptococci. Cultures showed streptococci in short chains. The organism was not pathogenic for animals.

CASE XV.—T. K., male, aged forty-six years. This case was seen through the courtesy of Dr. C. A. Hamann. When first seen, the left frontal sinus had ruptured spontaneously externally, and Dr. Hamann operated, thoroughly emptying the cavity and re-establishing drainage into the nose. Pus was obtained directly from the frontal sinus. Cover-slip preparations showed polymorphous nuclear leucocytes and small round cells, diplococci, and some bacilli. Cultures showed the staphy-

lococcus pyogenes aureus and a pleomorphic capsule bacillus very similar to Friedländer's bacillus, and pathogenic for guinea-pigs. (*B. mucosa capsulatus*.)

CASE XVI.—T. B., male, aged thirty-three years. This case was seen through the courtesy of Dr. F. E. Bunts. The patient has had a purulent discharge from the left nostril for one year, accompanied by pain and infiltration of the tissue around the second bicuspids of the left side. At present there is a slight purulent discharge from the left nostril; the left cheek is much swollen, the eye being nearly closed, and the whole left side of the face is exceedingly painful. The second bicuspids are badly decayed. An abscess extending from the first and second bicuspids to the median line of the palate was opened by Dr. Bunts. The patient refused further operation. Pus for culture was taken from the abscess in the mouth, due probably to extension from the left antrum. The pus on microscopical examination showed a large number of polymorphous nuclear leucocytes and some large mononuclear epithelial cells, and a large number of bacteria, the most prominent being diplococci and streptococci, but there were also long, thin spirilla. The streptococcus pyogenes and the staphylococcus pyogenes aureus grew on cultures.

CASE XVII.—C. N., male, aged seventy-one years. A patient of Dr. H. G. Sherman, by whose courtesy the case was seen. He had a severe coryza in 1866, and soon after noticed a continuous discharge from the left nostril, and then from the right. Two months before he was seen by Dr. Sherman he had gotten wet just after recovering from pneumonia. The next day the hitherto chronic discharge from the right nostril ceased. On the second day he noticed a small swelling of the right upper eyelid near the internal canthus. The next day he began to feel severe pain in the frontal region. The lid became swollen and the right eye protruded forward and outward. In this condition he consulted Dr. Sherman, who drained first the frontal and ethmoidal sinuses and then the right antrum.

From the ethmoidal and frontal sinuses and the antrum the streptococcus pyogenes and the staphylococcus pyogenes aureus were obtained. In one culture from the ethmoidal sinuses the *B. pyocyaneus* was obtained with the staphylococcus pyogenes aureus. Cover-slips made from the pus of these sinuses showed polymorphous nuclear leucocytes, many of which contained cocci, and epithelial cells, with granular protoplasm, swollen, and often fatty.

CASE XVIII.—Female, aged twenty-seven years, a patient of Dr. J. F. Stephan. She complained of toothache and of pain in the right side of the face. The second right bicuspids was found decayed, and on removal a large amount of creamy pus was obtained from the right antrum.

Cover-slip preparations showed large numbers of polymorphous nuclear leucocytes, some large, swollen epithelial cells, and many lanceolate diplococci in capsules. Cultures showed the diplococcus lanceolatus in pure culture. This organism was pathogenic for a rabbit.

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A SIMPLE METHOD FOR THE STERILIZATION OF CATGUT.

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THE successful sterilization of catgut means more than the destruction of the vitality of the adherent and contained micro-organisms, for asepticism must be conjoined with undiminished flexibility and tensile strength. Sterilization alone is easily accomplished, but the methods successfully employed to this end have, as a rule, been found to so seriously impair strength and flexibility as to be worthless for surgical purposes. Those which have proved best adapted to the desired end involve such considerable manipulation, or carry with them so many undesirable conditions, that a method simple in application and perfect in results has been the subject of considerable experiment.

The successful application of formaldehyde as a general disinfectant suggested to the writer that this agent might be of use in this particular direction, and in consequence a series of experiments was instituted. As will be noted, the first results, while most successful as to sterilization, were, in common with those of other methods, faulty in the directions above mentioned. Later experiments appear to have been completely successful.

EXPERIMENT I.—A lot of surgical instruments, including knives, probes, a director, forceps, needles, and scissors, all smeared with a culture of streptococcus, and six skeins of silkworm-gut and catgut, were placed in a glass cabinet of 200,000 c.c. capacity and subjected to the vapor of 5 c.c. formalin for four hours. Control cultures of each suture showed abundant growths. At the end of the exposure, cultures were taken from each object, and all proved sterile excepting the scissors, the blades of which had been tightly closed.

EXPERIMENT II.—Seventy-three skeins of catgut of assorted sizes, and three which had been soaked for two days in a bouillon culture of sporulating anthrax, were subjected for two and a half hours in the same cabinet to the same amount of formalin. Control cultures of each specimen showed abundant growths. Cultures taken directly after the exposure were sterile at the end of forty hours, with two exceptions. One yielded a long, non-pathogenic bacillus, and the other, from one of the skeins soaked in anthrax, yielded a mould. After seven days ten others showed moulds and yeasts.

EXPERIMENT III.—The preceding experiment was repeated, but with a longer exposure (seventy-two hours). No growths were observed until the tenth day, when three cultures yielded moulds. At the end of seventy-six days no further growths had occurred.

EXPERIMENT IV.—Six skeins of as many sizes of catgut were cut into inch pieces and soaked for five days in bouillon cultures of sporulating anthrax at 37.5° C. Half of them were then withdrawn and placed, in the wet condition, in open glass dishes in a horizontal glass

cylinder of 1500 c.c. capacity, and subjected for twenty-four hours to the vapor of one and a half c.c. of formalin. Two pieces of each size were then withdrawn and planted in bouillon. The remaining pieces were then again subjected to the same treatment for an additional twenty-four hours, when new cultures of each size were made, then to a third and fourth. The results of the cultures proved that from the first exposure all were sterile, no growths excepting an occasional one of mould being observed up to the fifty-fourth day, and these doubtless due to accident.

EXPERIMENT V.—The infected pieces not used in the preceding experiment were dried for twenty-four hours at 37.5° C. and subjected for three consecutive days to the action of the vapor of one c.c. formalin in the same manner. Controls showed profuse growths. At the end of each twenty-four hours two pieces of each size were planted. The only growths observed at the expiration of fifty days were four moulds.

EXPERIMENT VI.—In consequence of the growth of moulds in all these experiments, but with the belief that they must have been accidental contaminations from the cotton stoppers and from the air during the necessary manipulations, twenty-one different moulds were exposed for twenty-four hours to the action of one c.c. formalin in the same apparatus. At the end of the exposure every specimen was found to have been killed.

The foregoing experiments demonstrate that catgut which has been infected as thoroughly as is possible can be easily sterilized by formaldehyde. But what of its influence on strength and flexibility? To determine this question, skeins of each size were introduced into the cylinder and treated in the same manner with the same amounts of vaporized formalin. In each of the above experiments the formalin used was diluted with water before vaporization, and it was so treated in this instance. On introducing the agent, condensation of moisture was observed, and in a short time an accumulation of liquid occurred in the lower side of the cylinder. From day to day this was seen to diminish, and coincidently was observed a twisting of the skeins. In other words, the catgut was absorbing into its substance the diluted formalin. At the end of ten days the skeins were removed and tested. The smaller sizes were found to have been so affected that the mere tying of tight knots was sufficient to break them. The larger sizes, however, were found to have lost neither tensile strength nor flexibility.

EXPERIMENT VII.—In order to avoid the moisture, the next process tried was with paraform pastilles heated in a small Schering lamp connected, by means of a funnel having a bent stem, with the cylinder in which the skeins were placed. The further end of the cylinder was closed with a greased ground-glass plate, which, during the employment of the lamp, was moved laterally just enough to make a slight opening sufficient to allow the passage of the current of air impregnated with the vapors from the pastilles. The combustion of the alcohol required for their volatilization, however, gave rise to so much moisture in the cylinder that this method proved to be no better than the other.

The next process, than which nothing could be more simple and involve less trouble and manipulation, proved to be more successful.

EXPERIMENT VIII.—The greater part of a skein of catgut of medium size (No. 2) was placed in a salt-mouth jar of 1500 c.c. capacity, with a dozen paraform pastilles in a small beaker covered with fine copper gauze, and the jar was then closed with a tightly fitting stopper. The balance of the skein was set aside for strength-tests. Control cultures in bouillon yielded good growths. At the end of twenty-four, forty-eight, and seventy-two hours, the jar was opened, and small pieces were cut off and planted in bouillon tubes, and larger ones were withdrawn for strength-test. The results showed complete sterilization from the first day, and no loss of strength. The culture-tubes were kept in the thermostat thirty days, at the end of which time no growth whatever had occurred. The details of the strength-test will be found further on.

EXPERIMENT IX.—Three skeins of different sizes (0, 1, and 2) were cut into inch-pieces and soaked nine days at 37.5° C. in bouillon cultures of sporulating anthrax. Examination at the end of that time showed profuse growth, not only of anthrax, but also of streptococcus, moulds, and several other organisms, all of which must have been from original contamination of the catgut. The pieces were withdrawn from the culture-flasks, and half of them were placed in open glass dishes in an anatomical specimen-jar of 6000 c.c. capacity, with a dozen pastilles in a beaker covered with copper gauze. The rest were dried overnight at 37.5° C. and then introduced with the others. Control cultures gave abundant growths. When the dry specimens were introduced, samples of the moist ones, which had then been exposed to the impregnated air for twenty-four hours, were taken and planted in bouillon. On each of the next three days, specimens of each size of both the moist and dry pieces were withdrawn and planted. The only growths which occurred in the twenty-one cultures made were from two of the wet specimens taken at the end of the first day; all the others were completely sterile. No growth of any kind developed in the tubes during their forty days' stay in the thermostat. The results of this experiment demonstrate that the dry gas volatilized spontaneously from paraform pastilles has as great germicidal properties as the moist vapors from formalin.

In order to measure the action of the dry gas on the strength of the sutures, five skeins of sizes 00, 0, 1, 2, and 3 were placed in a similar jar, with the same number of pastilles, and confined ten days, when half of each was removed. The rest were left in the jar ten days longer, and then removed.¹

The results of the strength-tests indicate, so far as can be judged in the absence of a fixed normal standard of strength for each size, that neither tensile strength nor flexibility had been at all impaired. It is difficult and, indeed, impossible to state at what tension any specimen of catgut should break at the knot, for not only do different skeins of

¹ Since the above was written Experiment IX. has been repeated in all its details and with the same results. In order still further to test the exposed (sterilized) pieces of catgut, intraperitoneal and subcutaneous inoculations were made with them in guinea-pigs. No effects whatever were produced, the animals remaining perfectly healthy.

the same size give widely different averages, but the same skein yields no uniformity of results in its different parts. In attempting to ascertain the normal strength of the unsterilized gut, a number of skeins of each size were cut into pieces of equal length (15 cm.) and then these pieces in consecutive order, each with a single knot in the middle, were tested in the manner described below. As showing the absence of uniformity in the strength of the same skein, the following instances may be cited:

VARIATIONS IN STRENGTH OF CONSECUTIVE CUTTINGS OF SINGLE SKEINS.

The figures express the weight in grammes required to break the suture at the knot.

Size 00.	Skein <i>a</i> .	1660	2250	1295	1565	1315	1720
	Skein <i>b</i> .	1635	2445	1660	2465	1330	1330
Size 0.	Skein <i>a</i> .	1575	1810	1635	1600	2460	1915
	Skein <i>b</i> .	1475	2195	2225	1490	1065	2220
Size 1.	Skein <i>a</i> .	2120	1840	3045	2485	2575	3090
	Skein <i>b</i> .	4125	4940	5205	4480	4755	4225
	Skein <i>c</i> .	2980	3290	2325	3110	2730	3195
	Skein <i>d</i> .	5440	4680	5380	4425	5350	4905
Size 2.	Skein <i>a</i> .	5400	6275	5355	5850	7585	5915
	Skein <i>b</i> .	4225	3900	4205	4770	5225	4710
Size 3.	Skein <i>a</i> .	8845	6440	6420	7225	6990	8035
Size 4.	Skein <i>a</i> .	5710	3910	5200	3410	6525	5250
Size 5.	Skein <i>a</i> .	10875	8935	11210	9930	10175	8170

From the above figures it will be seen that in some cases the strength of two consecutive sections may vary very widely. Thus, pieces 2 and 3 of skein *a* of size 00 vary almost as 2 to 1; and pieces 5 and 6 of skein *b* of size 0 vary still more; cuttings 2 and 3 of size 5 vary almost exactly five pounds; 1 and 2 of size 3 over five pounds; and 4 and 5 of size 4 nearly seven pounds.

As showing the difference in the averages obtained by breaking entire skeins cut in pieces of the same length, may be cited the following:

Size 00	.	.	.	1498	1636		
Size 0	.	.	.	1773	1999		
Size 1	.	.	.	2481	4276	3310	4975
Size 2	.	.	.	6180	5823	4169	5837

From the above it will be noted that not only do skeins of one size vary in a marked degree one from another, but a specimen of a large size (No. 3 of size 2) may be less strong than other skeins of a smaller size (Nos. 2 and 4 of size 1). Illustrative further of this latter is the fact that a skein of size 4 averaged only 4975, while one of the next smaller size (Size 3) averaged 7910—a difference of about six and a half pounds the wrong way.

Following are the averages obtained in the tests of strength of skeins

of unsterilized and sterilized catgut, omitting the results of tests of the skeins whose strength was impaired by the wet process and by the heated pastilles.

					Sterilized.	
					10 days.	20 days.
Size 00	.	.	.	Unsterilized.		
				1498	1800	2596
				1636		
Size 0	.	.	.	1773	1679	1589
				1999		
Size 1	.	.	.	2481	2729	2565
				4276		
				3310		
				4975		
Size 2	.	.	.	5837	6886	6170
				6180	5993 ¹	
				5823		
				4169		
Size 3	.	.	.	7910	7004	7162
Size 4	.	.	.	4975	5354 ²	
Size 5	.	.	.	9810	9333 ²	

Examination of these figures must lead to the conclusion that the method of dry sterilization with the solid paraform has probably no effect either way on the tensile strength of catgut. Owing to the objections already mentioned, no normal standard of strength can be fixed; but assuming for the moment that the figures obtained in this series might be so regarded, it would appear that the smallest size gains strength, the next loses but little, the next gains and loses as compared with different skeins, the fourth gains, and the fifth loses but little, and that the two largest sizes sterilized by the wet method respectively gain and lose. As a matter of fact, however, the results simply demonstrate that in each case the sterilized gut behaves as does the unsterilized. The same lack of uniformity was observed in both kinds. The main result may be thus stated: It is impossible to prove either a weakening or a strengthening, but whichever occurs, if either, the sterilized gut is suited to all the purposes for which it is intended.

The method employed in determining the tensile strength was as follows: An upright iron rod was securely fastened to a base, and at its upper end was screwed an arm carrying a horizontal ring through which was placed, point downward, a pair of parallel-jawed pincers, which was prevented from passing completely through by the spread of the handles. This pair served to hold securely the upper end of the knotted suture. A similar pair, passed upward through an iron ring fastened by a wire to the handle of a two-quart pail, grasped the lower

¹ Average of skein used in Experiment S.

² Sterilized by the wet method.

end. When the whole was suspended from the upper ring, the handles were held in the rings in such a way that the greater the weight in the pail the tighter were the jaws of the two pineers closed on the interposed gut. In making a test, everything being in position, No. 5 shot was poured gradually from a lipped beaker into the pail until the suspended weight became great enough to break the gut at the knot. When this point was reached, the pail, its contents, and the lower pineers were transferred to a small platform-seale, sensitive to five grammes, and weighed. In 481 tests the eatgut failed but once to break at the knot.

THE SURGICAL TREATMENT OF EPILEPSY, WITH A REPORT OF FOURTEEN CASES.

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A FEELING of uncertainty, perhaps even of scepticism, as regards the beneficial results of operations on the brain or its membranes seems to pervade in a large measure the medical profession. This feeling is not confined to the general practitioners, many of whom are apt to believe that death generally follows cerebral operations, or, if recovery should follow, that the patient is as often injured as benefited by the surgical procedure. It extends, also, to the neurologist and to the surgeon, both of whom are inclined to feel rather discouraged concerning the results of these operations. There must be a basis for the widespread prevalence of this feeling. It has arisen in part, I think, from the many lamentable failures and the numerous mistakes in diagnosis which occurred in the earlier days of cerebral surgery, when the rapid advance which was being then made in the knowledge of cerebral localization apparently opened up to the surgeon an extensive field for brilliant operative work and encouraged him to undertake operations which, at the present day, would seem unjustifiable. This anticipation has, unfortunately, not been realized, and some half dozen years ago a reaction began against cerebral operations, and the pendulum has not as yet swung back to its proper position.

It must be acknowledged, however, that even at the present day there is sufficient justification for this feeling of uncertainty. The results of operation are far from satisfactory; errors in diagnosis are still frequent, and permanent recovery is still almost the exception rather than the rule. It is very difficult to estimate correctly the dangers and the benefits of operations on the brain. Statistics on this, perhaps more than on any other surgical subject, are most unreliable. The successful

issues are apt to be reported and the failures forgotten. Reports of single cases abound, many of them of great interest, but others so incomplete or made at so early a date after operation that their value, as to the final outcome of the case, is questionable. Unfortunately, but few series of cases with full details have been reported, and it is just such premises that are needed to enable us to reach just conclusions as to the probabilities—rather than the possibilities—of benefit to be derived from operation. Statistics are not entirely satisfactory and are apt to represent the subject in too favorable a light. Among the most accurate are those of Auvray and Starr. The former reports 145 operations for suspected brain tumor, in 79 of which the tumor was removed, and in 66 a palliative opening in the skull was all that could be accomplished. Starr reports 220 similar operations, in 73 of which the tumor was not found and in 7 of which it could not be removed. Concerning the dangers of these operations Starr reports on 140 cases where the tumor was removed, of which 48 died. In Auvray's 75 cases where the tumor was removed, 20 died, and in his statistics of 47 operations where, after search, the tumor could not be found, he reports 21 deaths occurring within three days after operation, a mortality of 44.09 per cent. I have no doubt that the mortality in these figures is far too small, and could all operations be tabulated I believe that the death-rate would be at least 75 per cent.

The results of operation for epilepsy, while, perhaps, equally discouraging, still offer a hope that by a careful selection of cases a reasonable chance of benefit may be promised to a small proportion of epileptic patients. It is too true that in the great majority of those who have undergone operation, no benefit has followed.

Thus, Bergmann, in the Twelfth International Congress, at Moscow, stated that he had attained a true and permanent recovery in only two patients out of fifty on whom he had operated for general and partial epilepsy. E. G. Mason (*Medical News*, March 21, 1896) collected, as he says, more or less at random from current literature, reports of seventy operations for epilepsy, of which, at the expiration of three years or longer, 4.03 per cent. were cured. Sachs and Gerster (*THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES*, October, 1896) report the result of nineteen such operations, of which, at the end of one year or longer, three patients were cured. While it is true that certain brilliant results have been reported, these have generally been in isolated cases, and often the report is made so soon after operation that it is of but little value as far as the final outcome of the case is concerned. In this connection it might be well to emphasize the fact that it is misleading to report a case as cured until a year or more has elapsed since the operation. Reports made at an earlier date may be of interest from a pathological or symptomatic point of view, but as regards the

final outcome of the operation they are worthless. Indeed, a three-years' period of freedom from attacks would give more truthful results, as more than one case has been reported where the convulsions have reappeared for the first time as late as two years after operation.

While it is true that the results of operation for epilepsy have been somewhat discouraging, yet we must bear in mind the condition which we are striving to cure. The disease is progressive and hopeless. If unrestrained, it generally ends in a condition worse than death. It seems justifiable in many such cases to make an attempt to relieve the patient by means of operation, provided that there is even a faint chance of effecting a cure. The danger to life is comparatively slight, probably not more than 5 or 6 per cent., and in certain cases there is a chance that improvement, at least, may follow. Of course, I am now referring only to cases which seem appropriate for operative interference, where we can with reasonable certainty locate the lesion and feel that there is a chance that it can be removed. In the great majority of cases this cannot be done, and consequently it is only a very small proportion of epileptics who can justifiably be advised to submit to operative interference.

The experience of the last twenty years has taught the neurologist and the surgeon many useful lessons concerning the diagnosis of cerebral lesions, and the possibility of their relief by operation. While it cannot be claimed that great advances have been made in this branch of surgery, yet we are in a better position than formerly to determine in what cases operation should be advised. There are numerous reasons, however, why we cannot, with much confidence, promise that benefit will follow the operation. Prominent among these are the following:

1. Uncertainty in diagnosis. In the motor areas of the cortex the location, if not the character, of the lesion can be determined with reasonable certainty; but the diagnosis of lesions in the frontal, occipital, and deeper regions is still apt to be unreliable. Any one who has witnessed many brain operations can testify as to the disappointment of the surgeon and, perhaps, the surprise of the neurologist when the suspected area of the brain contains no lesion visible, at least, to the naked eye. In the practice of most surgeons this has occurred so frequently that many of us feel very sceptical as to what will be found in any given case when the skull has been opened.

2. The inaccessibility of certain portions of the brain. While it is true that every point of the cortex can be reached, and that we can gain access to some of the deeper convolutions, yet certain portions of the brain must always remain inaccessible to the surgeon.

3. The character of the lesion. This may be such as to render its removal either impossible or inadvisable, as, for example, a disseminated malignant or even tubercular growth; or it may be of such an ill-

defined character that with the naked eye it is impossible to distinguish diseased from healthy brain tissue. The change in the cells may be so slight that, after the removal of a portion of the cortex, even with the microscope it is difficult to affirm that the lesion was sufficient to produce the epileptic seizures; on the other hand, the fault may lie in an altered blood-supply rather than in cell degeneration.

4. The post-operative lesions. As the result of operation, a cicatrix may remain in the cerebral tissue, thickening of the membranes or adhesions between the pia and dura may result, or, finally, a depressed cicatrix may become adherent to the cortex, any of which lesions may continue to act as a source of cortical irritation. In recent years these post-operative lesions have been frequently advanced as reasons for the failure of cerebral operations. I think, however, that their importance has been exaggerated. I believe that in a few cases they may act as a strong irritant, especially when the cerebral tissue of that particular patient has become exceedingly sensitive, owing to long-continued irritation. The theory, however, that such irritating cicatrices are of common occurrence seems to me to be somewhat invalidated by the fact that in recent traumatic cases extensive operations on skull, membranes, and even brain can be done almost with impunity as far as fear of future epilepsy is concerned. Most of us are familiar with the extensive lacerations and loss of cerebral tissue which occur as the result of injury, and yet, if the depressed bone is thoroughly removed, it is rare to see epileptic seizures follow as the result of the traumatism. That extensive changes, however, may be produced in the cortex as the result of the operation is shown in Cases XII. and XIII. of this series. In the former, as the result of a trephining, a thick layer of dense connective tissue was found pressing down upon the cortex, and as a result there had followed an atrophy of the underlying convolutions. At a future operation done one year later this same dense cicatricial layer was found, and, in addition, connective-tissue bands had extended down into the cortical substance, and the atrophy of the convolutions was still more marked. In Case XIII., as the result of former operations, and seemingly in consequence of the irritation of a piece of rubber tissue, a mass of cicatricial tissue the size of a small walnut was found dipping down into the cerebral tissue.

5. The damage which has already been done to the neighboring cerebral structures by the lesion for which the operation is performed. The gross lesion may be removed, and yet, in cases where the irritation has persisted for years, the secondary damage is often irretrievable. This is also illustrated in Case XII., though, of course, it is yet too soon to feel certain that regeneration of the atrophied cerebral tissue may not occur.

This same condition will also probably explain why excision of the

irritated centre in the cortex will so often fail to cure the patient. The sclerosis which has extended from the diseased "centre" to neighboring convolutions will continue to act as a cortical irritant. It is true that a few brilliant cures have resulted after such excisions, and in cases of epilepsy which are distinctly focal it is a perfectly legitimate procedure to excise that portion of the cortex which, under electrical stimulation, is shown to be the centre for the affected muscles. Unfortunately, however, the majority of cases thus treated have not been cured. This may be due to the sclerosis established before the operation or to the post-operative cicatrix. If for a period of months after the operation there be a temporary cessation of the convulsions, the cicatrix rather than the sclerosis may be blamed.

INDICATIONS FOR OPERATION. It is impossible to formulate definite rules as to the propriety, in any given case, of recommending operative interference. The first important point to be ascertained is the location of the lesion, and next its extent and character. In *traumatic* cases there is often a cicatrix or a depression in the skull which will naturally guide us to a certain locality. If the case be one of partial epilepsy, where the focal symptoms correspond to that area of the cortex over which is found the cicatrix or depression, the case is comparatively simple and is one appropriate for surgical interference. If the case, however, be still one of partial epilepsy, and yet the focal symptoms do not correspond to the location of the injury, difficulties at once present themselves. Operation may be indicated, and the question then arises, Where shall we trephine? Shall we select that portion of the cortex under the depressed bone, or shall we be guided by the so-called signal symptom? It is always difficult to decide this question, and whichever point is chosen there is always a chance that we have taken the wrong horn of the dilemma. The surgeon is, I think, more apt to choose the surgical indication, while the neurologist prefers the symptomatic indication. Sometimes a bone-flap can be lowered which will cover both areas, but more often they are situated on opposite sides of the head. While I am generally in doubt in such cases which side to select, yet I think my inclination in general favors the surgical indication. Whatever be the selection, a second opening can always be made over the other point suspected. If the case be one of general epilepsy following a traumatism, it is less favorable, but, perhaps, still suitable for operation. If the epilepsy has been general from the start, and if of long duration, the prognosis will be most unfavorable. If, however, we can find that in the beginning the epilepsy was partial, and afterward became general, the prognosis becomes more favorable. We know, both from experiments and history of patients, that a mild pressure on a certain motor area will produce a focal epilepsy, and if this pressure over the same limited area be increased, epileptic seizures of a general type will occur.

In the same way a pressure which has continued for months or years may change a partial into a general epilepsy.

In the *non-traumatic* cases we must be guided solely by symptoms. If the symptoms be focal, and especially if there be no loss of consciousness, the case is one favorable for interference. If there be loss of consciousness in addition to the focal symptoms, and it can be shown that this follows rather than precedes the convulsive movements, or if in the beginning such was the sequence of events, the case is still favorable for operation. If, on the other hand, loss of consciousness precedes the convulsive movements (focal), the case is one less promising, but still suitable for operation. If, however, the convulsive movements have been more or less general from the first, it is impossible to determine the situation of the lesion, and in such cases one cannot conscientiously recommend operation.

Apart from the external evidences on the skull, the two main symptoms on which we must rely for diagnosis of the situation and extent of the lesion are the paralysis and the convulsive movements of the muscles. Of these the paralyses are a much more certain guide than are the spasms of the muscles. If reliance be placed on the latter alone, we must expect to be occasionally led astray. We must also remember that hysteria will often simulate very closely a focal epilepsy. In uræmia, also, the symptoms may exactly resemble those of true Jacksonian epilepsy. I remember a case of this description in the care of one of my colleagues, where the muscular spasms were absolutely limited to the muscles of the right upper extremity.

After the location and, perhaps, the extent and character of the lesion have been ascertained, the question will then arise as to its accessibility. Can it be removed? In many cases it is evident that it is beyond our reach, or so extensive that operation is out of the question. In other cases the location and character of the lesion are so uncertain that we must consider the operation as more or less exploratory, and its character and uncertainty should be stated to the friends at least of the patient.

Another factor which has the greatest influence on the prognosis is the period of time which has elapsed since the first appearance of the epilepsy. This is of importance, perhaps not so much on account of the primary lesion as because of the secondary changes which have gradually extended to adjacent parts of the brain. If in a case otherwise favorable a few months only have elapsed since the traumatism, the chances of cure are good. It is otherwise, however, if years have elapsed. The chances of cure will then be in inverse ratio to the duration of the epilepsy.

A factor of less importance, but one which undoubtedly has some influence on the outcome of the case, is the nervous organization of the

individual. A lesion which in a neurotic patient with a bad inheritance will excite violent epilepsy may in a patient with a thoroughly well-balanced nervous organization be of but slight importance.

In general, it may be said that operation is indicated :

1. In all cases of focal or partial epilepsy (Jacksonian) where the convulsive movements or paralyses are limited to a particular group of muscles.

2. In all cases where the epilepsy, be it general or partial, has followed and is apparently caused by a depression in the skull, the result of a traumatism.

3. In many cases where a severe head-injury—even though there be no external evidence—has been followed by a partial epilepsy, and where the “ signal symptom ” indicates a definite area in the brain.

METHODS OF OPERATION. While it is not intended in this article to enter fully upon the details of cranial surgery, it may not be amiss to consider briefly the various methods which at the present day are more or less generally adopted for exposure of the brain. On this subject there exists considerable difference of opinion. That method is the best which is attended by the least shock, and which at the same time affords a free exposure of the cerebral cortex. In regard to the first of these requisites, time and hemorrhage are the most important factors. In many cases that method which renders it possible to replace the bone has a distinct advantage over methods which do not allow of this reposition. As a rule, the skull is opened and an exposure of the brain made by one or other of the following instruments :

(a) The trephine.

(b) The trephine and bone-forceps (aided, perhaps, by the saw).

(c) Chisels.

(d) Saws (or burrs) worked either by the hand or by a motor.

Each one of these instruments has certain advantages and disadvantages. The trephine is easily managed and its use is attended by very little hemorrhage and by no concussion of the brain ; on the other hand, it is often unwise to replace the bone thus removed, and it is not an easy task to expose by this instrument alone a very large area of the brain. The same remarks apply to the method by which the trephine opening is enlarged by means of bone-forceps, though in this way a large opening can be made more quickly, and if, in addition, the amputating saw is employed to make partial incisions through the skull, large portions of bone can be removed with great rapidity ; indeed, this is the most rapid of all methods if the powerful bone-forceps of Horsley are employed ; but it has the disadvantage that the bone thus removed can never be replaced.

In consequence of the permanent opening in the skull, adhesions of a troublesome character may attach the scalp to the cortex, and a de-

pressed cicatrix, irritative in its effects, may follow. To prevent this various procedures have been adopted. Plates of various kinds—silver, gold, horn, shell, celluloid, etc.—have been used to cover the opening in the skull (heteroplastic method). With the chisel a thin bone-flap has been cut and shifted to cover the opening (autoplastic). Another method is to insert under the skull and directly upon the pia, or the surface of the brain, a small, thin patch of one of various substances, such as silver or gold foil, rubber tissue, etc. Neither the number of cases reported nor the time elapsed since operation has been sufficient to enable us to judge which one of these various methods is the best. With any one of them failure must often be expected. The thin bone-flap will sometimes necrose and be discharged through one or more sinuses. The inorganic substances will frequently act as foreign bodies, and then must be removed. For a time it seemed that gold foil inserted upon the brain and under the edges of the bony opening would prove satisfactory, but latterly it has apparently been shown that granulations will, in certain cases, perforate and finally disintegrate this tissue. Rubber tissue employed in the same manner has been serviceable in some cases. One patient on whom I operated thirty months ago carries, without signs of irritation, a piece of this tissue on the surface of his dura. That it may, however, act as a foreign body is shown in Case XIII., and there is no proof that the so-called “life” of rubber should be longer in its new home than it would be in the external world. Platinum foil, as employed in the same case, seems free from these objections. I do not know of its ever having been used before for such a purpose, and sufficient time has not yet elapsed to show whether or not it will prove satisfactory. Celluloid plate used as a covering for the opening in the skull has been employed with success. A patient of mine has worn, with comfort, such a plate for two years. In Cases XII. and XIV. its presence so far has apparently produced no irritation.

The osteoplastic method was introduced to obviate the disadvantages of the older methods—*i. e.*, the difficulty of exposing a large area of the brain and the necessity of leaving a permanent opening in the skull. It has been very generally adopted. The bone-flap is cut by chisels, saws, or special bone-cutting forceps.

In regard to the use of chisels, there is a decided difference of opinion among surgeons as to the safety of this method. Those with the largest experience, such as Horsley and Macewen, object distinctly to the employment of these instruments on account of danger of concussion of the brain and of shock. As advocates, however, are surgeons with, perhaps, an equally large experience, such as Czerny, Schede, Bergmann, etc. By means of the chisel and mallet it is certain that a convenient exposure can be made of large areas of the cortex. The loss of blood, however, is considerable, and the danger of injury to the brain by the con-

cussion of the mallet cannot be ignored. As regards the time consumed in exposing the brain, this method has probably no advantage over that of the trephine and forceps. Its main advantages are that it enables a large exposure of the brain to be made, and that the bone can be replaced at the end of the operation.

The saws or burrs driven by mechanical power have a certain distinct advantage over all other instruments. This consists in the rapidity with which, *under favorable conditions*, a large opening can be made in the skull. As yet, however, neither the mechanism of these instruments nor our skill in handling them is entirely satisfactory. The power is at times difficult to control, and most of us need more practice in their manipulation. The saws manipulated by the hand are unsatisfactory, with the exception of Gigli's wire saw, which is a most useful instrument. It is rapid in its action, easy to manage, and produces no concussion of the brain. Of the special bone-cutting forceps, that of Dahlgren is probably the best, though personally I have not found this instrument satisfactory.

As has been already stated, it is of the utmost importance that a surgeon should give the result of his entire experience in operations performed for the relief of this condition. The histories which follow include all cases that have been operated upon by me for the cure of epilepsy. They are fourteen in number, and have been performed since the year 1890.

The results cannot be said to be encouraging, when we consider that all the patients had been carefully selected after weeks or months of observation. In the majority the diagnosis had either been made or confirmed by a neurologist. In this connection, I beg to express my thanks to Dr. M. A. Starr for referring to me several of these patients and for his valuable advice as regards diagnosis and the propriety of surgical interference, and for his counsel at the time of operation.

These cases represent but a small proportion of the patients which, during the past eight years, have been sent to me for operation. In the others, careful hospital observation for a few weeks convinced us that they were utterly inappropriate for surgical interference.

The final result in these fourteen cases, one year or longer having expired since the operation and also since the last manifestation of cerebral disturbance, is as follows: Cured, 3; improved, 5; unimproved, 4; unknown, 2; died, 0; total, 14.

It will thus be seen that three patients out of twelve have been *cured* by operation, or 25 per cent.¹ If, however, the limit of time when we can with safety declare a patient to be cured be placed at three years,

¹ Cases XIII. and XIV. are excluded from these statistics, as sufficient time has not elapsed since operation to judge of the final result.

there will be two patients only whom we can regard as permanently cured, a proportion of 16.4 per cent. Case XI., however, has been so well in the fifteen months that have elapsed since his operation that we can, I think, with reasonable confidence regard him as permanently cured. In the other two cases (I. and II.) six and a half and five and a half years, respectively, have elapsed since their operations. In each of these three patients the cause of the irritation of the cortex was found and removed, being in two of the cases (I. and II.) very distinct, and in the other (XI.) less marked, but perfectly appreciable.

Five patients have been *improved* by operation; in four of these (III., V., VII., VIII.) a well-marked lesion was found and apparently removed, while in the other (IX.) no lesion was visible or tangible at the time of operation, and when discovered by the microscope seemed very insignificant.

Four patients were *unimproved* by operation; in two of these (IV., XII.) a distinct lesion was found which, in Case IV., had existed for five, and in Case XII. for seven years. In another case (X.) the lesion found was of so slight a character that doubt was expressed by some as to its existence. In Case VI. no lesion was found.

These cases may be divided into: Traumatic, 10; non-traumatic, 3.

Traumatic cases. Examination before operation revealed in five of these patients (Cases I., II., V., VIII., XII.) a distinct depression of the skull, the existence of which, as well as of changes in the membranes, was confirmed at operation. In three others (III., X., XI.) there was apparently a slight depression found before and at the operation, and corresponding to this a slight thickening of the dura, neither of which lesions, however, was so marked as to lead us to expect that a cure would follow its removal. In the other case (VII.), while there was no external evidence of injury to the skull, yet there was found at operation on the surface of the brain, directly under the cleft of the scalp, marked evidence of disturbance of the blood circulation, presumably due to the traumatism.

Of these nine traumatic cases there were cured, 3; improved, 4; unimproved, 2. The histories show that of the three patients whom we may regard as *cured*, two (Cases I. and II.) had received their injury within a year of the time of operation, and in each of these the skull had evidently been severely damaged, as was shown by the well-marked depression found at operation. In the other (Case XI.) two years had elapsed since the injury, but this had apparently been much less severe, the depression of bone, as also the thickening of the dura, being but slight.

This latter case differs from the two former as regards both the situation of the lesion and the character of the epilepsy. In the former cases the lesion was situated directly over the motor area, and evidently had

acted as a cortical irritant sufficient to produce convulsive muscular movements. In the latter case the lesion was situated in the occipital region, and the attacks were psychical rather than motor in character. In this connection it may be of interest to note that in the two other patients (VII., X.) in this series, whose point of cortical irritation was in a somewhat similar region, at a distance from the motor area, the psychical element was a marked feature of their attacks. It is also of interest to note that in Case XIII., where the lesion was situated in the left frontal region, the motor element was predominant and the psychical but little noticeable.

In the six traumatic cases who were *not cured* (III., V., VII., VIII., X., XII.) the injury had been received many years prior to the operation, and a condition of chronic epilepsy had become well established.¹

Non-traumatic cases. Cured, none; improved, 1; unimproved, 2. The improvement of the one case (IX.) in this class who was at all benefited by the operation was less than that of any other case in the series. The microscope found a slight inflammatory change in the portion of the cortex removed and in its membranes. It is of interest to note in this connection that the excision of the hand centre produced apparently no effect on the muscles of the hand, either immediately following the operation or at a later date. Several similar results, or rather absence of result, after excision of a regional centre have already been recorded by other operators. The localized paralysis which generally results from such excisions have apparently never been permanent.

In Case IV. there was distinct evidence of a former pachymeningitis which, judging from the history, had occurred five years prior to the operation. The behavior of this patient during and for months after an attack of typhoid fever is of interest. The other case (VI.) was evidently a chronic idiopathic epileptic.

From the above statistics it will be seen that this series of cases forms no exception to the rule that the prognosis is much more favorable in the traumatic than in the non-traumatic cases.

CASE I. *Old, depressed fracture; motor epilepsy; cure.*—W. F., aged seven years, had always been a bright and healthy child. On December 20, 1890, he was hit on the right side of the head by a brick which had fallen a distance of thirty feet. He was knocked down, and appeared stunned for some minutes. After the accident he remained quiet for some days, and apparently entirely recovered. Some three months later, however, he began to have convulsions, the first attack occurring in the school-room without apparent cause. The epileptic attacks became more numerous, so that in the two months before his admission to the hospital he averaged one in three days. They generally began in

¹ Case III. may be regarded as partly traumatic and partly non-traumatic.

his left arm and, while not always confined to the left side, the convulsive movements were generally much more marked on that side. On admission, on June 19, 1891, he was partially stupid as the result of a fit. On the next morning, however, he appeared bright and happy. There were no paralyses. Eyes were normal. On examination of his head there was found over the right parietal bone a depressed cicatrix, and under this a depression in the bone about the size of a silver half-dollar. There was distinct tenderness on pressure on this point. He remained well until June 23d, when he had a convulsion beginning in the left forearm, extending to the left leg, the muscular twitching in both these extremities being very violent, and finally the spasms extended to the right arm and leg, though on this side they were much less violent. The convulsion lasted two to three minutes, and left him stupid and drowsy for a couple of hours.

June 25th, operation. Ether. The fissure of Rolando was marked on the scalp, and the cicatrix was found to cross this line near its centre. A large scalp-flap was elevated from over the depressed bone, the greater part of which was found to be anterior to the middle point of the Rolandic fissure. With an inch trephine projecting somewhat behind the depression, a button was removed. Its under surface was roughened, was depressed about an eighth of an inch, and was firmly adherent to the thickened dura.

The opening was considerably enlarged by bone-forceps. The dura appeared thickened and opaque. It was not opened. The scalp-flap was replaced and sutured. The bone was not returned. There was but little shock, and convalescence was uneventful. The boy was out of bed at the end of ten days, and left the hospital at the end of four weeks, apparently well. There had been no convulsions and no complaint of headache. After leaving the hospital he returned to school, and remained free from convulsions for a period of three years. At that time he returned to the hospital for a visit to his nurse and appeared mentally and physically well. Since then he has been lost sight of, but freedom from convulsions or other bad symptoms for a period of three years seems sufficient evidence to regard the case as cured.

CASE II. *Old, depressed fracture; motor epilepsy; subacute circumscribed meningitis; cure.*—Jean L., aged twenty-seven years; had always been a healthy and well-balanced youth until, in the summer of 1891, he fell down a flight of stairs and hit his head against the sharp edge of an umbrella-stand. He received a scalp-wound and was unconscious for several minutes, and remained in a dazed condition for an hour or two. His doctor said that he had received a slight fracture of the skull, but no operation was performed. He was kept in bed for about five days, and remained in the house for a week or so longer. Soon afterward he went to work, though complaining of some headache. On the afternoon of his second day at work he felt a severe pain in his head; he lost consciousness, and apparently had a mild epileptic fit. He remained away from his work for the following few days, and then resumed his post, and was comparatively well for about a fortnight, when he was again seized with a convulsion. Since that he has averaged one or two convulsions a month. In spite of the administration of bromide, the attacks have recently been more frequent, and while at first the convulsive movements were confined mainly to the left arm and leg, latterly they have been more or less general, though still always

more marked on the left side. He has been carefully watched by Dr. C. J. Platt, who sent him to me for operation. Latterly, his family have noticed a slight impairment of memory, and occasionally he seems rather irritable.

On admission, June 17, 1892, he seemed an intelligent, well-nourished man. Eyes normal. Examination of urine negative. No paralyses. On examination of his head there is seen a cicatrix over the right parietal bone, about two inches to the right of the median line. Under this there is a distinct depression of the bone involving a space about the size of a silver quarter-dollar. There is tenderness on pressure over this point.

June 20th, operation. Ether. A rubber band was placed around the head and a semicircular scalp-flap reflected, with the cicatrix near the centre. A line drawn on the scalp to represent the fissure of Rolando passed through the posterior part of the depressed bone, which after reflection of the scalp was seen to be quite distinct. It was embraced by the crown of a trephine one and a quarter inches in diameter, and a button of bone was removed. The roughened under surface was very adherent to the dura, and after its removal the stellate projection was seen to be about one-twelfth inch in height. The opening in the bone was enlarged to double its original size by bone-forceps. The dura was opaque and thickened. The brain pulsation was diminished. The dura was opened by a curved incision and the flap reflected. It was found intimately adherent to the pia over a circular area an inch and a half in diameter. This latter membrane was opaque and lustreless over the same area, where there were also several large veins. They were not disturbed. Brain pulsation now appeared normal, as did its consistency. The dura, which seemed at least double its normal thickness, was closed by interrupted silk sutures. The scalp was closed without drainage, the bone not being replaced. The operation lasted forty minutes, and but little shock followed. Three hours after return to the ward the patient had a mild convulsion limited to the left side. His further convalescence was uneventful. Temperature reached 100° on the second day, and then fell to normal. Headache was not complained of. He was out of bed on July 12th, and was discharged from the hospital on July 22d, apparently well.

In September he resumed his position as clerk, and has been well ever since. He makes no complaint of headache; has advanced in his business position, and has had no suspicion even of a convulsion or muscular twitching. I have seen him this autumn (five years after operation), and he is perfectly well. Pulsation through the opening in the skull is scarcely noticeable, on account of a very dense tissue almost as hard as bone, which has filled up the opening and is entirely insensitive to pressure. This patient must certainly be regarded as cured.

CASE III.¹ *Traumatism; epilepsy, motor and psychical; drainage of lateral ventricle; improvement.*—Male, aged twenty-nine years. History of occasional attacks of unconsciousness since age of twelve, but no convulsions. In October, 1892, thrown down stairs on head, followed by stupor and partial paralysis of left arm. Soon after, convulsions and mental disturbance, which continued intermittently till January 4th,

¹ Cases III., IV., and VII. have been already reported in THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, March and November, 1891. A brief résumé is here given.

when severe convulsions, stupor, and delirium. Mental disturbances increased. January 31st, operation. Trephine opening in right occipital bone. Slight depression and thickening of dura found. Drainage of lateral ventricle for forty-eight hours. Gradual improvement. Since then he has had an occasional convulsion, averaging one a year, and always after a prolonged spree. He is still a heavy drinker, but mind remains clear. This case can be regarded as *improved*.

CASE IV. *Old pachymeningitis; motor epilepsy and paralysis; subdural organized clot; unimproved*.—Female, aged six and a half years. At age of eighteen months series of convulsions, without apparent cause, followed by partial paralysis of right arm and leg. Soon recovered, and well until the age of four, when similar attack, which disappeared, and well for six months, when another attack; since then repeated convulsions and persistence of paralysis. In convulsions head turned to right, and twitching right hand and foot. Trephine opening over left fissure of Rolando. Dura adherent to bone and thickened. Under it thin layer of connective tissue. Removed. Dura closed. Slight improvement followed for six months, when convulsions returned violently. Typhoid fever; no convulsions for four months. The child has since been lost sight of, but it was learned a year later that she still had convulsions. The case is, therefore, best regarded as *unimproved*.

CASE V. *Traumatism; depressed fracture; motor epilepsy; improved*.—John C., aged twenty-five years, admitted June 12, 1893, was a perfectly healthy lad until the age of twelve, when he was hit on the side of the head by a shinny stick. He was dazed for a few minutes, but did not lose consciousness. He complained of headache for a week or so, and a few months later he had his first convulsion. Since then his convulsions have recurred several times a month, though in the past year he has had but fifteen. They begin with an aura, a "queer feeling" in his head; he cries out, and then falls in a convulsion, which appears to be more or less general. He remains unconscious about an hour. Otherwise he seems well, though his friends notice that his memory is becoming impaired, and at times he shows great irritability.

On admission, on June 12, 1893, he appeared a well-nourished young fellow, with a normal pulse and temperature. On examination, a sear an inch long was seen on the right side of his head just over the temporal ridge and two inches behind the frontal eminence. The eyes were normal, as were all the special senses. There was no paralysis. On June 12th he had a severe convulsion lasting five minutes, which involved both upper and lower extremities, the eyes being turned toward the right. On the 13th he had another convulsion. It was the opinion of the nurses and other patients that at times he acted strangely, and was often very forgetful.

July 17th, operation. Chloroform. A semicircular scalp-flap was lowered, with the sear at its centre, and beneath this was found a slight depression of the skull and a very adherent pericranium. A one-inch trephine covered the depressed area, and on removing the button of bone a slight linear prominence was seen on its under surface. By bone-forceps the opening was enlarged downward and forward. The dura under the anterior part of the opening was opaque and evidently thickened. The brain pulsation was scarcely noticeable. The dura was opened, a considerable amount of colorless fluid poured out (about an ounce), and the brain pulsation then seemed normal, as did also the

pia. A hollow needle was inserted into the cortex at two points, but the syringe withdrew no fluid. The dura was sutured, as was also the scalp-flap. The bone was not returned. There was no evidence of shock during or after the operation. There was a slight general convulsion as the patient was being lifted from the stretcher into his bed. With the exception of slight convulsions, his convalescence was uneventful, the temperature never rising above 100° . The convulsions occurred on June 18th, July 11th, 15th, and 16th. He left the hospital on July 16th, and since that time has been comparatively well. In 1894 he had two convulsions; in 1895 two convulsions; in 1896 one convulsion, and none since Christmas, 1896. The attacks have always followed some great nervous excitement. He cannot be considered as cured, but he certainly has been much *improved* by the operation.

CASE VI. *Non-traumatic motor epilepsy; unimproved.*—Louis R., aged twenty-nine years; had been a bright and healthy boy until he reached the age of fifteen, when, without apparent cause, he was seized with a convulsion. His family history was good, and there was no history of traumatism. Since that time he has been a chronic epileptic. The fits at first occurred about once a month, but have been gradually increasing in frequency, and for the past year he has averaged two or three convulsions a day. They seem to be general. Lately his memory has become much impaired, and he is at times very irritable, and gives way to violent outbursts of temper. On admission, on June 22, 1893, he appeared well nourished, but had the appearance of a chronic epileptic. At times he acted strangely and was very forgetful. His first convulsion occurred on August 8th, when he suddenly lost consciousness and had violent muscular spasms, which, however, were much the most marked in the right hand and arm. On the 11th and 13th he again had convulsions, and on both occasions the spasms were likewise more marked in the right upper extremity.

After consultation with Dr. Starr, it was decided justifiable to make an exploratory trephining and expose the motor area of the left side of the brain.

August 17th, operation. Chloroform. The fissure of Rolando was marked on the scalp and a scalp-flap was lowered, which exposed the parietal bone over the middle and lower part of the motor area of the left side. A one-and-a-half-inch trephine opening was made, with its centre over the fissure of Rolando. The dura, which was opened, seemed slightly thicker than usual, but otherwise no abnormality in appearance or resistance of either brain or membranes was noticed. The dura was closed by catgut. The scalp was sutured, the bone not being replaced. No shock followed the operation. The temperature did not reach 100° , and convalescence was uneventful, with the exception of an occasional convulsion. The patient remained in the hospital off and on for nearly a year, and during that time he averaged two to three convulsions a month. There was no manifest improvement in his mental state. Since then his condition has remained unchanged: convulsions occur as before. He has derived no benefit from the operation.

CASE VII. *Traumatic epilepsy characterized by psychological attacks; headache; removal of small angioma; improved.*—S. F., aged twenty-one years. Until five years of age bright and happy. Then received a severe blow on head, followed by unconsciousness. Since then never entirely regained his mental balance, and suffered from pain in left side

of head. Excitable. At age of sixteen second fall on head, followed by unconsciousness. Since then symptoms more severe. Frequent severe headaches and occasional maniacal attacks and loss of consciousness. Scar and irregularity of bone midway between left parietal boss and median line. Trephine opening at this point, one and three quarters inches behind the fissure of Rolando. Dura opened and vascular mass, consisting of large varicose veins, found on surface of brain. Removed by ligation. Discharged from hospital in twelve days, apparently well. Since then he has been comparatively well. He has no headaches or return of his attacks of epileptic nature, but occasionally he becomes excited, and is at times irritable. It is fair to consider the case as one improved by operation.

CASE VIII. *Traumatic recurrent local meningitis; improved.*—Mary S., aged nineteen years, admitted March 16, 1896, was a perfectly healthy child until, at six years of age, she fell from a height and sustained a severe injury of her head. The skull was said to be fractured, and she was confined to bed for several months. Since that time she has never been entirely well. Up to the age of thirteen she suffered from frequent severe headaches, and at times lost consciousness for a minute or two. Between the ages of thirteen and seventeen she seemed to improve, the improvement commencing with the appearance of menstruation. At the age of seventeen (in 1894) she was seized with "brain fever," and was confined to bed for many weeks, being unconscious for fourteen days. During this illness her muscles frequently twitched violently; she had no paralyses. She recovered and from March, 1895, till three days before her admission to the hospital, with the exception of the headaches, she was comparatively well. On March 13th she was seized with a severe headache, and soon became unconscious, and remained so for twenty-four hours. During the next two days she complained of terrible headache; she vomited frequently, and there was considerable muscular twitching. On March 16th she was brought to the hospital. She still complained of headache, and photophobia was marked, as was also Romberg's symptom. Temperature was 99.5°, pulse 112, respiration 28. The urine contained a trace of albumin. She was stupid and listless, at times irritable, took but little interest in her surroundings, and complained constantly of pain in her head.

On examination of the head a scar one inch long was seen about the centre of the head just to the right of the median line, and beneath it was apparently a depression in the bone.

During the week before the operation the condition remained very much the same. She was drowsy part of the time, and at times moaned and complained of her head. There were also muscular twitchings of both extremities. There was no paralysis, neither did a distinct convulsion occur. Her temperature remained between 97.5° and 99° and her pulse between 80 and 90. The diagnosis was made of local meningitis, with pressure on and irritation of the cortex.

Operation, March 24th. Chloroform. On measurement the cicatrix was found to be just one inch to the right of the median line, and was bisected by a line drawn on the scalp to represent the fissure of Rolando. A horseshoe scalp-flap was reflected. A slight depression was found under the scar and to this the pericranium was very adherent. A trephine one and a quarter inches in diameter was placed over and slightly external to the depressed area, and a button of bone removed.

The dura was intimately adherent to the bone, was much thickened by the presence of new tissue, and presented a very vascular appearance, being covered by large, distended veins. Pulsation was entirely absent. By bone-forceps the opening in the skull was enlarged outward.

The thickening of the dura had evidently been caused by a chronic pachymeningitis. It was opened by a crucial incision, and was found very adherent to a layer of tissue which lay between it and the pia. This layer, about one-quarter of an inch in thickness, was composed of pinkish, almost jelly-like tissue rich in bloodvessels, evidently the product of a comparatively recent inflammation. It extended beyond the limits of the opening in the skull, which was accordingly enlarged outward and backward till the limits of the meningeal exudate seemed to be reached. This corresponded to the oval opening in the skull, about three inches in the antero-posterior direction and two inches laterally. On elevation of the dura the brain pulsations appeared, and, after scraping from the pia the layer of soft inflammatory tissue, the pulsations seemed normal, as did also the resistance. On the surface of the cortex were now seen a large number of dilated veins which almost hid the cerebral tissue from view. These large veins were tied at six spots by fine catgut ligatures. A hollow needle was thrust into the cortex without result. After careful hæmostasis, the dura was sutured, as was also the scalp. The bone was not replaced. A drain of gauze was inserted under the flap, as there was considerable oozing of blood. The operation lasted seventy minutes. No motor symptoms were noted. Convalescence was uninterrupted. The mental state was brighter on the day after operation, and continued to improve until her discharge from the hospital. There was no further complaint of headache, and the patient seemed fairly intelligent. On April 1st there was a slight general convulsion, and she was rather stupid for half an hour afterward. There was no loss of consciousness. On April 10th she was out of bed and seemed bright and happy. The temperature had reached 100° on the second day, but afterward remained under 99°.

On May 3d she appeared so well that she was allowed to leave the hospital. She walked without staggering, and appeared to be in a normal mental condition. Since then she has been practically well. She occasionally complains of headache, but since the operation she has never been confined to bed for a single day. During the past year I have been unable to make a personal examination, but her sister reports that she is in excellent health and that she is able to do her work intelligently. As, however, in the past she has had long periods of comparative freedom from head symptoms, it is, perhaps, wiser to consider the case as *improved* rather than cured.

CASE IX. *Non-traumatic motor epilepsy; excision, hand centre; improved.*—Bessie H., aged sixteen years, admitted November 22, 1896. Personal and family history good. She had always been a strong and sensible child. No history of traumatism. In December, 1894, she began to suffer from "spells."

She noticed that suddenly, without warning, her right arm and leg began to twitch. Since that time she has suffered more or less continuously from twitching in right hand and occasionally in the right foot and leg, and also of the facial muscles on both sides. Sometimes, for weeks, she would not twitch, and then again for weeks she would suffer from several spells every day.

In December, 1895, the attacks of twitching were so severe that she was kept in bed for six weeks. For the four months following this she was almost free from attacks, when they again recurred as before. In August, 1896, she suffered from another series lasting for some weeks, and again just before admission to the hospital.

Her general health has remained good. She has never lost consciousness, and has never suffered from hysterical attacks, at least from any symptoms that her family or physicians considered as due to hysteria.

She was admitted to the medical division by the advice of Dr. M. A. Starr, who wished her kept under observation for some weeks. After her admission she suffered from frequent spasms of a mild character, affecting the right hand and forearm and occasionally of the right leg. The thumb was most affected by the spasms, it being drawn inward across the palm. Under the influence of bromide these diminished in frequency, so that for a day or so she would be almost entirely free from twitchings of any kind. As soon, however, as the drug was discontinued the spasms returned with increased frequency, so that at one time she had from one hundred to one hundred and eighty in the twenty-four hours. At first it was a question whether the spasmodic contractions were due to hysteria or epilepsy. After careful observation, however, Dr. Starr decided that the attacks were epileptic in character, and advised a trephining and exposure of the arm-centre on the left side.

On November 24th she was anesthetized with chloroform. The thumb and wrist-centres were marked out on the scalp, and with these as a centre a bone-flap, horseshoe in shape, was cut by means of chisels. The bleeding from the bone was very free. The bone-flap was reflected and the dura exposed. It seemed normal. It was opened by a crucial incision. The pia and cortex appeared normal, but the intracranial pressure seemed exaggerated. The cortex was stimulated by faradic current and the thumb-centre located. This corresponded exactly with the spot which had been marked out on the scalp. As no lesion was visible, it was decided to excise the hand-centre of this side, which seemed to occupy a space on the surface of the cortex about three-quarters of an inch square. Accordingly, a portion of the cortex, about one inch square and three-quarters of an inch in depth, was excised. The hemorrhage which followed was slight. The dura was sutured and the bone-flap replaced. There was considerable shock during and after the operation, but the patient rallied quickly.

On November 26th there was some slight twitching of the hand, but with this exception she seemed perfectly well until December 13th, when she had a general convulsion, and during the next ten days several others; otherwise her convalescence was uninterrupted, the wound healing by primary intention. She remained in the hospital as a servant for the following two months, and during this time, with the exception of two general convulsions, she seemed perfectly well. The spasms had apparently entirely disappeared. There was no paralysis or weakness of the muscles of the hand or arm following the operation.

The microscopical report by Dr. Thatcher is as follows:

"In the cortex a few areas where the small cells are rather crowded, some of them appearing to be leucocytes. In the membranes hemorrhages, some small vessels contain many leucocytes."

She returned to her home in the country in the beginning of April, and, with the exception of two or three convulsions during the early

summer, her father reported that she seemed perfectly well. She could not, however, use her right hand with precision. Her last convulsion appeared in July. On December 10th she returned to the hospital for observation. She seemed to be in robust health, and appeared bright and happy. The bone-flap had united perfectly, though it was somewhat elevated above the rest of the cranial vault. Movements of the thumb and fingers of the right hand were impaired. There did not seem to be a loss of power, but rather an inability properly to co-ordinate her movements. There was also a tendency on the part of the thumb to flex itself over the palm of the hand. There appeared to be no distinct muscular spasms, though there was a tendency to tremor of the thumb when it was kept under observation. The improvement in her general mental state was pronounced, though, perhaps, her gain of more than a year in age might explain this. Her father, however, was very positive that she had been improved in every respect by the operation. He hoped by another operation the complete use of the right hand might be regained, but on consultation with Dr. Starr we decided to defer any further operative interference for at least another year, and in the mean time to consider the case as one *improved* by operation.

CASE X. *Traumatic epilepsy, motor and psychological; unimproved.*—Charles P., aged thirty-three years. A moderate drinker, without history of syphilis. He had always been well until eight years ago, when he was caught in a machine shaft and carried around the wheel for several revolutions and, when finally thrown off, struck against a heavy beam. He was picked up unconscious, in which state he remained for five or ten minutes. He received a small scalp wound, but his physician said that there was no sign of fracture of the skull. He was confined to bed and to the house for several weeks, and suffered from severe headache. He soon returned to work, and was comparatively well until three years ago (January 18, 1894), when he noticed some weakness of his legs. In July, 1894, he fell over a chair and received a lacerated wound of the penis which bled profusely. On the following day he lost consciousness for a few seconds, and on recovering his senses felt a severe headache. A few minutes later a convulsion occurred, which was followed by a series of others short in duration, but quite violent, in which his whole body twitched. He appeared well for a month, and then, in August, he had another series of convulsions, and another in September, and again in December. During the month before his admission the fits had been much more violent and more frequent, sometimes as many as forty in twenty-four hours. They were preceded by an ache in the back of his head, a dimness before his eyes, and then, suddenly, spasmodic contractions of his muscles occurred. The convulsions involved all his muscles and were very violent. He would spring out of bed, smash furniture, and try to jump out of the window. At times he was very noisy and maniacal for a few seconds. Between the attacks he felt fairly well, except that his legs occasionally gave way under him.

By the advice of Dr. Starr he came to the hospital for operation. On admission, January 14, 1897, his temperature was 98.5°, pulse 84, respiration 24. He seemed irritable and at times surly. On January 15th he had a series of violent convulsions. They began with clonic spasms in his right leg and hand, rapidly passing into a general tonic spasm, his head being thrown back, his muscles all rigid, and his body in a state of opisthotonus. This was followed by very violent muscular spasms

of his whole body and an occasional yell. The movements were very violent, and, with two orderlies and a nurse trying to restrain them, he dragged all three over a large space on the floor of the ward. The convulsions lasted about two minutes, and then for several minutes his mind was apparently clear, when he had another convulsion of the same character, and so on until six had occurred. For some hours afterward he was dazed and weak, but again in the evening he had another violent convulsion. On the 16th he seemed all right, but on the 17th and again on the 19th he had another series of convulsions. On examination of his head a cicatrix was found in the left occipital region near the parietal suture, and beneath this there seemed to be a slight depression of bone. It was decided to perform an exploratory trephining in order to expose the brain under the apparent depression.

On January 21st, after a hypodermatic injection of gr. $\frac{1}{4}$ morphia, chloroform was administered. A large horseshoe incision was made in the scalp, inclosing the motor area of the left side and part of the occipital bone and also the cicatrix. Under this was found a small linear irregularity and depression in the bone near the junction of the left parietal and occipital bones.

A button of bone, one and one-quarter inches in diameter, with the depression near the centre, was removed. The bone at this point was much thickened and sclerosed. It was as hard and as solid as ivory. The opening was enlarged toward the median line by bone-forceps until normal bone tissue was found, the opening being somewhat circular in shape and about two and one-half inches in diameter. The dura appeared somewhat thickened, but was not abnormally adherent to the bone. It was opened by a cross incision. There were no adhesions to the pia, which appeared cedematous; brain of normal appearance and consistency. As there was no indication of any cortical lesion, the dura was closed by suture, as was also the scalp. The bone was not replaced.

No sign of shock followed the operation. The maximum temperature was 99.5°, and pulse 88, on the second day. On January 28th there was some twitching of the face and right fingers, but apart from this there were no convulsions, and his mind appeared perfectly clear. He was discharged on February 6th. After leaving the hospital he seemed all right, and in spite of warnings he went to work, and was well until February 14th, when he became dizzy while walking in the street; he hurried home, and just as he was entering his house he had a severe convulsion, followed on the next day by several others. The convulsions were even more violent than before the operation, and they were accompanied by great psychological excitement. He returned to the hospital on February 17th. During the next few days he had several violent seizures, in spite of bromide. Under the influence of this drug he became milder, and for some days before he again left the hospital he was free from spasms. He returned home on March 18th. After his return home his convulsions returned, and, though no trace of him can be found, it is fair to presume that he has not been benefited by the operation. The case is regarded, therefore, as *unimproved*.

CASE XI. *Traumatic. Old fracture, psychological epilepsy; cured.*—H. C. J., aged thirty-one years. Admitted January 17, 1896. A man of temperate habits, without history of syphilis, and who had always been strong and well until two years before admission, when he fell a distance of twenty-five feet, striking on the back of his head and shoul-

ders. He was unconscious for nearly an hour, and for a week or so afterward suffered from severe headache. At the end of three weeks, however, he returned to his work as a carpenter. About a month later, while at work, he experienced a sudden severe headache, beginning in the back of his head and becoming general. This continued all evening, but by the next morning had disappeared and for the next month he felt perfectly well, when he was seized with another violent headache which lasted for several hours. Since then the headaches have come more frequently and have been more severe. During the past six months he has had one or two severe headaches every week, and sometimes they would persist for several days, and recently he has suffered almost continuously from a very severe headache. His friends say that latterly he has at times been irrational, and that he appears listless and stupid. He takes no interest in his surroundings, and his memory is impaired; he often acts as if demented. There have been no convulsions. Occasionally he has apparently lost consciousness for a few moments.

On admission temperature was 99.2° , pulse 78, respiration 20. On examination, a small sear was seen just above and to the right of the external occipital protuberance. Beneath this was felt apparently a small depression in the bone. Eyes normal. No sign of paralysis.

On January 21, operation. Chloroform. Anæsthesia preceded by hypodermatic injection of gr. $\frac{1}{2}$ morphia. A large horseshoe incision was made, beginning just behind and above the right ear and carried up to the median line, then downward over the occipital bone. The flap when raised exposed the right half of the occipital and posterior part of the right parietal regions. There was a slight irregularity of the bone under the cicatrix, but no depression. At this point a one-inch button of bone was removed by a trephine, this being just above and one inch to the right of the external occipital protuberance. The opening was enlarged by bone-forceps forward and upward. The dura, not abnormally adherent to the bone, but markedly opaque and considerably thickened, was opened by a crucial incision. Pia and brain appeared normal. As no further exploration seemed justifiable, the dura was closed by catgut sutures, as also the scalp. The bone was not replaced.

He convalesced rapidly and uneventfully, and was out of bed on January 29th, and was discharged on February 5th, apparently well. His friends report that he has appeared perfectly well in every respect since his departure from the hospital, and he writes on December 8, 1897, "I have had no headache whatever like I had before the operation. The place on my head has not filled out very much; it is quite sensitive if I hit it. I am feeling very well." This case is regarded as cured.

CASE XII. *As a result of mastoid trephining; motor epilepsy; thick cicatrix and cyst; unimproved. Second operation; rubber tissue and celluloid plate.*—Edward M., aged nine years, was admitted to the Presbyterian Hospital on February 23, 1897. At the age of twenty-two months he had suffered from a right otitis media, with perforation of the drum-membrane, followed by a mastoiditis, for which an operation was done. Immediately after the operation the mother noticed a loss of power in the left arm and leg. The ear was cured, and the child was apparently well for a period of eighteen months. At the age of three and a half years he began to be feverish and restless, and would wake out of sleep with a sharp cry. Soon afterward he had several epileptiform convulsions, limited chiefly to the left side and

occurring almost daily. On one or two occasions there were also convulsive movements of the right arm. In October, 1894, the skull was trephined over the right motor area, and after that operation the fits disappeared, and did not recur till July, 1896, since which time he has had from one to three convulsions daily. The convulsions are followed by drowsiness, which lasts for several hours.

On admission the boy appears fairly well nourished and seems to possess ordinary intelligence. A depressed area is seen behind the right ear and another in the right parietal region, beneath which is felt a circular opening in the skull, within which the scar is evidently adherent to the intracranial structures. There is marked paralysis of the extensor muscles of the left forearm, with some atrophy and wrist-drop. The left ankle shows some rigidity, and there is partial paralysis of the extensors of the foot. Reflexes are normal, as are also the eyes.

On February 25th he had a convulsion characterized by violent jerking of the arms, especially the left; it was followed by unconsciousness, which lasted for three minutes, and drowsiness for several hours. In other respects the boy seemed perfectly well and was bright and happy. Operation was deemed advisable, as there was evidently cortical irritation of the motor area due to the depressed and adherent scar. It was thought that by an operation this could be relieved, and that, perhaps, some additional focus of irritation might be revealed. The old trephine opening was situated directly over the centre of the fissure of Rolando.

Operation March 2, 1897. Chloroform. A semicircular skin-flap, with the trephine opening in its centre, was carefully dissected from the edge of the opening and from the dura, to which it was firmly fastened by connective tissue. The opening in the skull was circular in shape, about one and a half inches in diameter, and its edges had been beautifully smoothed and bevelled by nature. A layer of connective tissue, one-sixteenth of an inch in thickness, was dissected from the surface of the dura and removed. The dura was then seen to be much thickened (one-eighth to one-quarter of an inch), and near the centre of the opening was seen a cyst which contained about ten drops of clear, straw-colored fluid. A cross incision was made, and the flaps raised from the pia to which the dura was adherent. This latter membrane was much thickened, opaque, and cedematous. The brain pulsation, which before had not been noticeable, now appeared. The thickened dura was cut around the edges of the opening in the skull, and removed. The hemorrhage had been but slight, and after a few minutes' pressure seemed to be controlled. To replace the dura which had been cut away, a circle of rubber tissue somewhat larger than the trephine opening was inserted on the pia under the skull. Over the trephine opening, and projecting somewhat beyond its edges, was placed a sheet of celluloid one one-hundredth of an inch in thickness, and over this the scalp-flap was sutured in place. The shock of the operation was very slight, and the boy returned to the ward in excellent condition.

On the three following days one or more convulsions occurred each day. On March 5th, as there seemed to be an accumulation of fluid under the celluloid plate, the wound was partially reopened and an ounce of bloody serum allowed to escape. The rubber tissue seemed rough and crumpled, and was withdrawn, as was also the celluloid plate. A drain of rubber tissue was inserted and the scalp resutured. During the following fortnight three convulsions occurred. There was no noticeable rise

of temperature at any time. On March 23d the boy was taken home. Since then his father reports that the convulsions have occurred almost as frequently as before the last operation. There seems to be but little change in the paralyzed muscles. The case may be regarded as one *unimproved* by operation.

It was, however, considered justifiable to make another attempt to cure the boy. Accordingly, on January 25th, chloroform was administered, the scalp-flap was reflected, and the trephine opening was again found filled by a layer of dense connective tissue an eighth of an inch in thickness. It was depressed upon the surface of the brain, and from its under surface there extended into the cortical substance fibrous prolongations. After this layer had been dissected off the cortex and removed, it was seen that the underlying convolutions were markedly atrophied, the atrophy extending even beyond the limits of the trephine opening, the surface of the brain lying at a distance of an inch from the under surface of the skull, while beyond this there was practically no space between the cortex and the bone. The consistency of the cortical convolutions under the opening was different from that of normal brain tissue, giving on palpation a sensation of diminished elasticity. Considerable time, perhaps fifteen minutes, was occupied in checking the oozing of blood. A few catgut ligatures were used. A patch of rubber tissue was placed on the surface of the brain and its borders tucked under the edge of the opening in the skull, which was then covered by a plate of celluloid projecting about one-third of an inch beyond the edges of the opening.

The scalp was sutured without drainage. The boy recovered well from the operation, but about eight hours afterward he began to have convulsions, which occurred with great severity, one after the other, until he was quieted by bromide. After twenty-four hours had elapsed he appeared well and happy, and he was out of bed on the eighth day. He was and has continued (one month) much brighter since the operation, and there has been no recurrence of his fits. A considerable collection of fluid was felt under the celluloid plate, and on the seventh day a probe was inserted and an ounce or more of bloody serum allowed to escape. The wound healed throughout by primary union, and at the end of four weeks there is no sensitiveness on pressure and the edges of the plate cannot be felt. What the result of this last operation will be time alone will tell.

CASE XIII. *Old, depressed fracture; motor epilepsy; trephining; insertion rubber tissue; recurrence; excision of large cicatricial mass; insertion of platinum foil.*—Walter N., aged seventeen years. In August, 1892, he fell and struck his head on the pavement. Unconscious for a time, and when brought to the hospital a few hours later semi-comatose. A slight abrasion was found in the left frontal region. There was partial paralysis of right arm and leg. His mental condition gradually improved, but paralysis remained. An incision was made over the anterior parietal region and a linear fracture found which ran forward and ended just over the left eye in a stellate depression one inch in diameter. Depressed portion removed. Paralysis disappeared, and patient left the hospital in twenty-five days, perfectly well, and remained so for eighteen months. At that time he began to have convulsions, which increased in frequency till they averaged two or three a month. In 1895 he underwent an operation, the cicatrix being re-

moved and a patch of rubber tissue being inserted under the edge of the opening. After this he was well for twenty months, until November, 1897, when he began to "feel queer." On January 30, 1898, he was seized by a severe convulsion, which was followed by others at frequent intervals for forty-eight hours, when, on February 2d, he was brought to the Presbyterian Hospital, his convulsions, which lasted for five minutes, having for the previous day recurred every half hour. On admission he was in bad condition, semi-comatose, with a feeble pulse of 130 and a temperature of 104°. Under the influence of bromides and strychnine his condition improved, and from February 4th to February 8th he averaged but one convulsion a day. He was forgetful and excitable, but not irritable. He was eager for operation, as he said the rubber tissue must have become displaced. There was no paralysis. There was a small superficial ulcer at the junction of two cicatrices, and over the left eye could be indistinctly felt an opening in the bone, but the brain pulsation was not perceptible.

On February 8th, operation. Chloroform. A scalp-flap was lowered over the old trephine opening, which was found filled with dense connective tissue, to which the scalp was intimately adherent. A layer about one-sixteenth of an inch thick, was dissected off. Under this there was felt a mass of apparently cicatricial tissue, very hard except near the centre, where there was a roundish nest consisting of softer, almost granulation-like tissue in which were seen blackish particles which were found to be scraps of rubber tissue amalgamated with the soft connective tissue into a mass the size of a small cherry. This was cut out by scissors. There still remained a hard, dense mass of fibrous tissue, which dipped down to the depth of one and one-quarter inches into the substance of the third frontal convolution. It was removed, and presented the appearance of a fibroma. This mass was oval in shape and measured one and one-half by one and one-quarter inches by one inch. Considerable oozing followed its removal, which was controlled temporarily by sponge-packing. The opening in the skull was enlarged by bone-forceps until healthy cortical tissue was found. On account of oozing of blood it was deemed wise to resort to a light packing of gauze, the cavity and surface of the brain being first lined by rubber tissue to prevent adhesions of the gauze to the brain. The scalp-flap was sutured in place over the packing. No shock followed.

Two days later (February 10th) chloroform was again administered, the sutures removed, the scalp-flap lowered, and the gauze and rubber tissue removed. The cavity in the brain had diminished considerably in size, and the area under the bony opening, which before had been somewhat depressed, had risen to the under surface of the skull. The brain, however, looked somewhat unhealthy on its surface, and it was not deemed wise to insert a permanent plate. Accordingly, rubber tissue leading out of the wound was temporarily placed on the surface of the brain, and the scalp-flap sutured in place. The patient continued bright and contented, without sign of convulsion. Five days later chloroform was administered, the scalp-flap lowered, and the rubber tissue removed. The brain was now found bulging slightly through the trephine opening, with a perfectly smooth surface covered by a thin layer of fibrin. There was no evidence of the cavity, which one week before would have held a small walnut. The fibrin was gently removed, and over the surface of the brain was placed a patch of plati-

num-foil about the thickness of a sheet of note-paper. The scalp-flap was sutured. Primary union resulted. Eight weeks have now elapsed since the removal of the cicatricial mass, and so far there have been no convulsions, and the boy appears perfectly well.

CASE XIV. *Old, depressed fracture; motor epilepsy; trephining; insertion celluloid plate.*—William P., aged twenty-three years; had been a bright and healthy boy until the age of eight, when he fell down stairs and struck on his head. He received a scalp wound of the forehead. He was comparatively well for two years following, when he began to have convulsions. For eight years the fits were mild, but very frequent, often as many as four or five a day. Latterly they have been more severe, but less frequent. Sometimes a month or two of freedom will intervene between the attacks, and, again, several may occur in the twenty-four hours. At times he becomes unconscious, and remains in a stupid condition for an hour or two after the convulsion. At other times—and this has especially been the case in the last six months—there is no loss of consciousness and no resulting drowsiness. The convulsions, according to his own and his friends' account, have been more or less general, though the muscular twitching has been invariably most marked in the right hand. During the past year or two he has become very irritable, and is gradually losing his memory. On the advice of Dr. A. A. Smith, he came to me for operation, and entered the Presbyterian Hospital on January 28, 1898.

On examination there was found in the centre of the forehead, about two inches above the root of the nose, a cicatrix, and beneath this a slight depression of the bone, situated in the middle line. The depressed portion appeared to be about half an inch in diameter. He remained under observation for five days, and during that time had two convulsions. One was carefully observed by the nurse. The patient was standing, when suddenly his whole body became more or less rigid, and he would have fallen had not the nurse caught him. When she reached him his right fingers were flexed and rigid, and his thumb was in a state of tonic contraction across the palm of his hand. His left hand was relaxed. The fit continued one to two minutes. There were some slight general clonic contractions, but his right hand was decidedly more affected than any other part of his body. There was no cry and no loss of consciousness. The fit was not followed by drowsiness.

Operation March 1, 1898. Chloroform. A T-shaped incision exposed the depression in the bone. The surface was roughened, and the pericranium was very adherent. With a one-inch trephine a button of bone was removed, including the depressed area. The dura was slightly injected and possibly thickened. The brain pulsations appeared normal. The dura was opened by a crucial incision. The surface of the brain, on inspection, appeared normal. There was a subsidence, however, rather than the bulging of the cortex through the opening in the dura, as is generally seen, and on palpation the cerebral substance seemed less resistant than usual. A hypodermatic needle was inserted at two points through the cortex, but no fluid was withdrawn. The dura was sutured with catgut, and a plate of celluloid was placed over the opening, projecting slightly beyond its borders. The scalp was sutured. No signs of shock followed. The patient was out of bed on the third day. Primary union resulted.

REVIEWS.

DISEASES OF THE EYE. By EDWARD NETTLESHIP, F.R.C.S., Ophthalmic Surgeon at St. Thomas' Hospital, London; Surgeon to the Royal London (Moorfields) Ophthalmic Hospital. Revised and edited by W. T. HOLMES SPICER, M.A., M.B., F.R.C.S., Ophthalmic Surgeon to the Metropolitan Hospital and to the Victoria Hospital for Children. Fifth American from the Sixth English Edition. With a Supplement on Color-blindness by WILLIAM THOMSON, M.D., Emeritus Professor of Ophthalmology in the Jefferson Medical College of Philadelphia. With two colored plates and 161 engravings. Philadelphia and New York: Lea Brothers and Co.

WHEN a book has reached its sixth edition it is customary to say that it is so well-known as to require no introduction, and so, with the fewest possible words, to dismiss it. But would it not be profitable for the reviewer sometimes to take a successful book and endeavor to determine the reasons for its success? If book-reviews are not simply book-news or book-advertisements, the careful consideration of a book that has achieved its place in literature must occasionally be profitable, both for reviewer and reader, and especially for the would-be author.

From a long acquaintance with the work, from the reading of reviews of it, from discussing it with ophthalmologists, and its use as a text-book for students, we have come to see very good reasons why Nettle-ship's *Diseases of the Eye* should have reached its sixth edition.

In the first place, it is well written. It is fairly systematic without the sacrifice of other valuable qualities to what seemed to its author a proper system of arrangement. 2. It covers its subject extremely well. There are no serious omissions. In this it compares well with many larger and more pretentious books. 3. It approaches everything from the practical side. Diagnosis and treatment are the leading thoughts in every chapter and paragraph. 4. It was one of the first books on ophthalmology to give a good account of diseases of the eye in relation to general diseases. 5. Its appendix contains a great deal of detailed information about drugs, formulæ, instruments, etc., which the young practitioner and student found neglected by the writers of other books on the subject.

These are the advantages which, having been combined by conscientious labor under mature professional judgment, and being well presented by publishers, have given Nettle-ship's work its popularity, and make it to-day, perhaps, the most widely recognized text-book on the subject in the language.

For the present edition it may be said that it has this advantage: it has been revised, not by the author, but by another competent ophthalmologist, who, approaching the subject from a somewhat different point of view, was more sure to see the deficiencies of the former edi-

tions, while his relations to the author restrained him from introducing statements of views peculiar to himself. On this account, and especially with Dr. Thomson's supplement, the book reflects to a remarkable degree the present position of ophthalmology, having the broader basis of joint production and the continuity of single authorship.

The advanced development of American ophthalmology in certain directions is also met by discussion of certain subjects, as "Heterophoria," from the American stand-point. Such discussions are introduced in brackets, to relieve the original author from responsibility for matter which, from the English conservative point of view, might still be judged of doubtful value.

The colored plates, introduced in this edition for the first time, show the Holmgren test colors and Dr. Thomson's arrangement of them for testing color-blindness.

E. J.

A CLINICAL TEXT-BOOK OF SURGICAL DIAGNOSIS AND TREATMENT, FOR PRACTITIONERS AND STUDENTS OF SURGERY AND MEDICINE. By J. W. MACDONALD, M.D., Professor of the Practice of Surgery and of Clinical Surgery in Hamline University, Minneapolis. With 328 illustrations. Octavo, pp. 798. Philadelphia: W. B. Saunders, 1898.

THE title of this book would seem to indicate that it is a comprehensive treatise on surgical diagnosis and treatment. Examination, however, shows that the promises held out by the title have not been fulfilled. About one-half of the volume is devoted to the discussion of the diagnosis and treatment of diseases of the digestive system and the genito-urinary system of the male and female. The discussion of these topics is valuable, and will be found useful by those who have not familiarized themselves with recent advances in these departments of surgery.

Much of the remainder of the volume seems to have been hastily prepared, and is, in consequence, a very poor contribution to surgical literature. This criticism may seem harsh, but will undoubtedly be concurred in by any surgeon who examines the section devoted to the diagnosis and treatment of aneurism, admittedly one of the most important conditions which the surgeon has to treat.

The section devoted to fractures is similarly incomplete and inaccurate. A writer who classifies fractures as, 1, incomplete; 2, complete; and, 3, compound, exposes himself to the unfavorable criticism of a reviewer.

The literary style of the work is bad, though, in this respect, it has many rivals in recent medical literature, for defective education or careless writing has made the statements of many medical authors obscure. On page 48 will be found one of many illustrations of this characteristic.

"Other blood-tumors bearing a close relation to aneurysm, but not falling strictly within the definition, are certain tumors."

Many similar illustrations can be found in the pages of this rather pretentious volume. On page 69, for example, it is almost impossible to understand the dressing which the author describes as appropriate for the fracture of the humerus which he discusses.

A surgeon of experience will be able in most instances to understand what the author means, but "students of surgery and medicine" and practitioners of average experience will often find it difficult to get aid from the author in the cases requiring careful diagnostic study and judicious treatment for which they consult him.

The present methods of advancing the sale of new books on professional subjects have a tendency to encourage the production and sale of professional works thus carelessly and hastily produced. The absence of frank criticism aids in the dissemination of this class of literature. Scientific books to be valuable must be not only accurate, but free from literary obscurity. It is a belief in the necessity of these attributes that impels the present reviewer to speak in terms which may seem unkind of the volume under examination. The author has undoubtedly produced a book containing much information; but it is by no means so valuable a book of reference as it might have been and would be if it had been written carefully, accurately, and clearly.

J. B. R.

THE PRACTICE OF SURGERY. By H. R. WHARTON, M.D., and B. F. CURTIS, M.D. Philadelphia: J. B. Lippincott Company, 1898.

THIS is a volume of over eleven hundred pages well printed and admirably illustrated. The whole science of surgery is presented concisely, accurately, and up to the present date. The style of the writing is attractive. It is eminently a practical book.

The latest methods of treatment are very carefully and clearly described.

It is unnecessary and it would be undesirable to present here the details of the various chapters. No text-book of surgery discusses the treatment of surgical diseases in as helpful a way as does this book.

Many differences of opinion will exist always as to the details of any special treatment; but looking through the whole book it may be fairly stated that the most modern views in surgical pathology are enunciated, and that the treatment based upon this pathology is that generally accepted as best.

To the student looking for a text-book this is the one he will find most satisfactory.

To the general practitioner anxious to secure the last and best opinion concisely expressed in any surgical matter, this is the book he will be glad to own.

C. L. S.

TEXT-BOOK OF NERVOUS DISEASES. By CHARLES L. DANA, A.M., M.D., Professor of Nervous and Mental Diseases in Bellevue Hospital Medical College, etc. Fourth edition, revised and enlarged. With 246 illustrations. New York: William Wood & Co., 1897.

DR. DANA'S text-book is already so well known, and has been reviewed so often in previous editions, that it seems scarcely necessary here to submit it to extended criticism. It has always seemed to us to

be admirably adapted to the uses of those readers, whether students or practitioners, who want information that is at once full, accurate, condensed, and ready at hand. The author has managed, in remarkably small space in the earlier editions, to traverse the whole field of neurology, giving to each subject only its due proportion of space and elaboration. To be sure, the fourth edition has grown to be a book of considerable bulk, but this was probably inevitable in the hands of a writer who, like Dr. Dana, must feel the need of advancing with his special science while, at the same time, ignoring nothing that has been attained in the past.

It is evident that the fourth edition has been completely revised, and is, in some important particulars, quite a new work. Thus, the chapters on Microscopic Anatomy and on the Anatomy of the Brain and Spinal Cord have been rewritten so as to conform with the prevalent views of the importance of the neuron. How long these views will hold against the work of Apáthy and others no writer can foresee; but we hope it will not be necessary for Dana to rewrite these chapters again for his fifth edition. Important changes have been made also in the chapters on the Peripheral Nervous System, Acute Encephalitis, Multiple and Combined Sclerosis and Neurasthenia. The substitution of many new for old illustrations is a noteworthy feature of this edition, and adds much to its freshness and originality.

Dana is especially conspicuous among neurologists for his practical sense and for his aim to be of some therapeutic service to his patients. This characteristic is well marked in his text-book, and gives it a special value for practitioners.

Among practical, every-day topics we have been especially struck with the author's description and treatment of neurasthenia. This chapter, which is essentially new, is in every sense excellent, and is evidently founded on extensive observation and close acquaintance with the subject. Dana finds that heredity, overwork, worry, injuries, infections, and the abuse of the sexual functions and of alcohol and tobacco are the chief causes. He traces the various forms from simple primary neurasthenia to the anxiety neuroses, or neurasthenia with fixed ideas, and avoids the common error of confounding the affection with others of the neuroses, especially hysteria. From the pathological side he regards neurasthenia as the expression of an hereditarily bad nerve structure, upon which exhausting and depressing agents have been at work. He gives credit to Hodge for demonstrating the changes in the nerve-cell under the influence of fatigue. Cases caused by shock and trauma are thought to be due primarily to changes in the vascular system. Finally, due importance is attached to autogenous poisons acting upon the neurons. In his recommendations for the treatment of this often grave and obstinate affection, Dana goes carefully into details and criticism of the various plans most in vogue, and, in fine, presents us with a chapter on the whole subject that is a most valuable feature of this latest edition of his book. We especially recommend it to those who do not make a specialty of nervous diseases and who want a clear and concise statement of facts.

Among new chapters is one on alcoholic meningitis—the serous meningitis or “wet-brain” of some writers. This is the condition often found in cases of chronic alcoholic poisoning, and, according to the author, is really not a meningitis, but a toxemia of the brain, with serous effu-

sion. This important disease is described in full, and we wonder as we read, and recall what we also have seen at autopsies, that it has not been more fully recognized as a disease-entity by other writers than it has.

In conclusion, we need only say that in his fourth edition Dana not only maintains but adds to the reputation of his text-book.

J. H. L.

A MANUAL OF CLINICAL DIAGNOSIS BY MEANS OF MICROSCOPIC AND CHEMICAL METHODS, FOR STUDENTS, HOSPITAL PHYSICIANS, AND PRACTITIONERS. By CHARLES E. SIMON, M.D., late Assistant Resident Physician, Johns Hopkins Hospital, Baltimore; Fellow of the American Academy of Medicine. Second edition, revised and enlarged. With 133 illustrations on wood, and 14 colored plates. Philadelphia and New York: Lea Brothers & Co., 1897.

It is such a short time since the reviewer wrote a critique of Simon's *Clinical Diagnosis* for this JOURNAL (March, 1897), that but a brief word concerning the second edition will be necessary. The fact of the early exhaustion of the first edition is the most commendatory tribute to the work that can be spoken. The book has touched a popular chord and has been found of practical value as a laboratory guide.

For the benefit of those who may not be familiar with the character of the work, it may be said that it treats only of diagnosis by means of microscopic and chemical methods, resembling in its scope Jaksch's *Diagnosis*. Chemical and microscopic methods are described in such detail that even the student or practitioner who has not had special training in such manipulations will, by a little practice, be enabled to obtain satisfactory results. The special value of these methods as diagnostic aids, the conclusions one may reach from positive or negative results thus obtained, are clearly set forth. There is a praiseworthy discrimination shown in the selection of methods, only those being described that are simplest, most reliable, and most practical. Both in the descriptions of methods and the deductions to be drawn from various manipulations one is made conscious that the author is not giving a mere text-book- or second-hand picture, but that he himself has by personal experience qualified himself to pass competent judgment upon them.

The subjects treated are the blood, the secretions of the mouth, the gastric juice, feces, nasal secretions, sputum, urine, transudates, exudates, cystic contents, semen, vaginal discharges, and milk.

In this second edition there have been omitted some of the older and more complicated methods of chemical examination, while others more exact and more recent have been added. The volume is larger by fifty pages than the first edition. "The parasitology and bacteriology of the blood, saliva, feces, urine, and vaginal discharges have been almost entirely rewritten."

Widal's reaction is clearly described; Neusser's basophilic granules are mentioned; lumbar puncture and the examination of the cerebrospinal fluid are fully considered; the Boas-Oppler bacillus is accorded recognition; Rieder's investigations of the cells in pleural exudates

are noted, and everywhere one finds evidence that the endeavor to bring the present edition thoroughly up to date has been successful.

No matter how skilled a physician may be in his ability to cross-question a patient and elicit facts of aid in establishing a diagnosis; no matter how erudite his touch or how delicate his sense of hearing as he makes a physical examination; no matter how judiciously he weighs the facts gathered by subjective and objective examination, he must, in a large number of cases, call to his aid the microscope and the test-tube before reaching his decision. Sputum and urine and blood have to be interrogated by the modern clinical methods before a scientific conclusion is reached. To those aiming to equip themselves so as to be able to make these thorough examinations that lead to the comprehensive diagnosis, Simon's work is a most valuable and reliable guide—practical, clear, concise, up to date.

J. B. H.

ORTHOPEDIC SURGERY. By JAMES E. MOORE, M.D. Illustrated.

Octavo, pp. 354. Philadelphia: W. B. Saunders, 1898.

THIS book is written from the stand-point of a general surgeon who has taught orthopedic surgery for the past ten years, and who believes that the orthopedic surgeon should know when and how to operate. The book is written as a text-book for students and as a ready-reference book for general practitioners. In its dual capacity it is more likely to be consulted as a reference-book by general practitioners than it is to be used as a text-book by students in the medical colleges, since there are better books for the latter purpose already in use. There is much in the book that is practical and safe, and some of the sections are particularly good. It is to be regretted, however, that in considering the scope of orthopedic surgery no classification has been adopted, and the limits of this special branch of surgery have not been clearly defined. The subject of lateral curvature represents the modern methods of treatment, and the section upon the treatment of cold abscesses represents the middle ground occupied by the best orthopedic surgeons of to-day. The treatment by incision, antiseptic irrigation, and immediate hermetic closing of the wound is highly recommended and indorsed by the writer of this review. The subject of internal derangement of the knee is suggestive of confusion of pathological ideas, and as such had better been omitted.

The illustrations are remarkably good, most of them taken from actual cases, and the book reflects credit on the publisher, and should add greatly to the already excellent reputation of the author.

J. K. Y.

CLINICAL METHODS: A GUIDE TO THE PRACTICAL STUDY OF MEDICINE.

By ROBERT HUTCHISON, M.D., M.R.C.P., and HARRY RAINY, M.A., F.R.C.P. EDIN., F.R.S.E. With 137 illustrations and 8 colored plates. Pp. 552. Philadelphia and New York: Lea Brothers & Co.

IN the preface the authors state that their work is not intended as a treatise upon medical diagnosis, but that it aims rather at describing

those methods of clinical investigation by the proper application of which a correct diagnosis can alone be arrived at; hence the title *Clinical Methods*. A work of this kind is in reality what the student needs. He must first of all learn how to investigate a given case before taking up the question of diagnosis proper. Every year thousands of young men are sent out from the medical schools all over the country who have not as yet mastered the A B C of practical medicine, while they may have passed most satisfactorily examinations upon the theory of the subject. This is unfortunate, and it is high time that our medical schools should appreciate the importance of first instructing the students in the technique of clinical examination before entering more deeply into the theory of medicine. The basis of the art of diagnosis is a thorough knowledge of clinical methods and of a definite system of examination. The work before us will really prove most valuable as a guide in this direction, not only to the medical student, who should study it most assiduously at the bedside, but to the young practitioner as well. We unhesitatingly recommend it as one of the best with which we are acquainted. Throughout the book excellent illustrations, explanatory of the text, are scattered in abundance, which will greatly aid the student in grasping the important points considered.

The sections devoted to the study of the blood, the urine, pathological fluids, and clinical bacteriology are excellent.

We also congratulate the publishers upon the very attractive appearance of the entire work.

C. E. S.

LECTURES ON THE MALARIAL FEVERS. By WILLIAM SYDNEY THAYER, M.D., Associate Professor of Medicine in the Johns Hopkins University. Pp. vi., 326. New York: D. Appleton & Co., 1897.

THIS volume is the logical outcome of the association of abundant opportunity with the ability and industry necessary for the thorough study of a subject which, like the malarial fevers, has made such rapid advances within the last few years. Probably no other group of diseases is so generally misunderstood by the general profession as are the malarial fevers; and probably no other term serves to quite the same extent as a cloak to cover up the egregious errors in diagnosis of a not inconsiderable proportion of unthinking practitioners as does "malaria." This fact the author of the present volume conclusively proves by citing the health statistics of New York City and Brooklyn, which, during the six years ending in 1890, show a larger percentage of deaths from malarial fever than is shown to occur in the same localities during the same period from typhoid fever. It is evident that the extent to which errors in diagnosis are to be held accountable for this high death-rate in localities essentially non-malarial is enormous, and only to be explained by a prevalence of dense ignorance among a large number of the profession concerning the disease in question. If these lectures do aught toward remedying this deplorable condition of affairs the appearance of the volume would be more than justified were this the only result accomplished. The value of the contribution, however, is far greater than this, as in the series of nine lectures the author essays the scientific consideration of the malarial fevers as we understand these

diseases at the present day. As such is the scope of the work, it is somewhat regrettable that the title chosen by the writer does not clearly indicate it, for the present volume, together with the author's studies of the malarial fevers in association with Hewetson, may be regarded as the most valuable and thorough contributions to the study of these diseases in the English language.

More is to be said than that this volume amply repays its perusal; it should be studied by every physician who makes the slightest claim to a desire to be conversant with this group of diseases, in no other than which has our knowledge in recent years undergone more radical changes.

T. G. A.

A SYSTEM OF PRACTICAL MEDICINE. Edited by A. L. LOOMIS, M.D., and W. G. THOMPSON, M.D. New York and Philadelphia: Lea Brothers & Co., 1897.

THE third volume of this work contains descriptions of diseases of the alimentary canal, peritoneum, liver, gall-bladder, spleen, pancreas, and thyroid gland; also chronic metal poisoning, alcoholism, morphinism, etc.. The names of some of the contributors are R. C. Cabot, Doek, Hare, W. W. Johnston, Kinnieutt, Lyman, M. Allen Starr, Vaughan.

The importance of such a system of medicine must not be judged, except in rare instances, by the value of any one article, but by the general excellence of all the papers; and considering this volume as a fair specimen of the entire work, it appears to us on the whole satisfactory, without attaining a high degree of merit. Odious as comparisons are, it is, however, fair to judge the work by other systems which have appeared or are appearing. In Pepper's earlier *System of Medicine*, Welch's article on carcinoma of the stomach was so admirable that it made it important to own the *System*, since this article is continually referred to. In the new *System* no such article has yet appeared, and we feel as though we did not require the volumes on our shelf. If it were a question of the purchase of this American *System* or the English one appearing synchronously, under the editorship of Allbutt, we would prefer the latter. We do not intend to compare individual articles, but the English *System* seems to us to contain more papers of permanent value than are to be found in the American. We question whether there was any real demand or need for this American work. This is the age of "literary scribbling," as it has been lately aptly termed, and while we would not for a moment imply that "scribbling" could be applied fairly to any of the papers in this volume, yet we feel that were it not that printing is so cheap, and the desire to appear in print so rabid among the profession, this *System* would not have appeared. It may be asked for whom are such systems written? Is it for the student, the recent graduate, or the older practitioner? After a longer or shorter time in practice the physician no longer wants profound articles on all branches of medicine, but instinctively turns to special works on the subjects in which he is most interested, and rather than buy a five or six volume work he will purchase books dealing with only those diseases. The cost of such systems must limit their extensive sale,

and we believe it would pay better for men to publish their articles separately rather than in these expensive compilations.

In this volume of 900 pages 200 are given over to the consideration of the diseases of the liver and gall-bladder by Graham, of Toronto, Canada. It is a careful study of the diseases in question, and the most thorough article in the volume, but could with advantage have been somewhat condensed.

Johnston's paper on diseases of the intestines is unsatisfactory. It is one of the hardest subjects to treat well; but this article is superficial, and in a system of medicine these diseases should be described with the utmost thoroughness. The remarks on the physiology of digestion are more suited to an elementary introduction on this subject than to a paper written for advanced students.

Purpura is treated by Lockwood, who divides this affection into three groups: 1. Symptomatic purpura. 2. Purpura rheumatica. 3. Purpura hæmorrhagica. This division may be as good as any possible at present, but that it is not satisfactory is evidenced by the difficulty the author has in keeping the divisions distinct. Such trouble is largely due to our ignorance of the underlying causes of purpura, but with a little more care, we think, the paper could have been made clearer.

In an otherwise essentially good paper on diabetes mellitus, by Coleman, there occurs the following sentence: "The prognosis as regards the continuance of life is favorable, when diabetes mellitus has become transformed into diabetes insipidus." Either there is some mistake here, or the statement demands elucidation, since such transformation is not generally supposed to occur.

Starr's paper on cretinism and myxœdema is excellent and illustrated by some of the most interesting photographs of children suffering from the latter disease that we have seen.

The volume, as a whole, is quite up to date, and the selection of authors for special subjects has been well chosen; and yet there is little that is new, nothing markedly original, and nothing to stamp the work as one of much present value or of lasting benefit to the profession.

R. N.

PROGRESS OF MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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Inhalations of Vinegar to Control Nausea and Vomiting after Chloroform.—DR. J. TORRANCE RUGH states that the inhalation of vinegar for the relief of vomiting was first proposed in 1829. The explanation, as given by Lewin, is that the free chlorine, one of the products of chloroform, is neutralized by the acetic acid; the chlorine, acting as a marked irritant to the pharyngeal mucous membrane, induces vomiting. The simplest explanation of the good effects of vinegar is that its pungency stimulates—it being too dilute to exert any irritative action—the respiratory mucous membrane, promotes the normal secretions, and, by its soothing action upon the peripheral nerves of the parts, lessens the irritability of the pneumogastric or its centres, and the reflex condition of vomiting is controlled. Furthermore, that this is a restorative and soothing stimulant to the respiratory tract and to the nervous system is well attested by its widespread use in vinaigrettes in place of “smelling salts.” It also relieves thirst, is free from toxic effects, and its simplicity and efficiency commend it.—*Philadelphia Polyclinic*, 1898, No. 9, p. 110.

Note on Diastatic Preparations.—DR. WILLIS E. TUCKER has tested the diastatic properties of certain preparations of malt containing cod-liver oil. Three specimens of each manufacturer were carefully tested, and the results are stated in parts by weight of maltose, or its equivalent, in reducing sugar, produced by one part of each of the preparations examined, and the averages as found were as follows: (1) 4.54, (2) 1.46, (3) 0.52. The first preparation was maltzyme. Such preparations as this have been aptly styled “digestive foods,” and their value depends upon the amounts of active diastase which they contain. For this enzyme, possessing the property of bringing starch in food into a soluble condition and converting it into easily assimilable forms of dextrin and sugar, is a valuable aid to digestion in cer-

tain cases, and if its activity is unimpaired it is capable of exercising important influence upon the digestive process when properly administered.—*Albany Medical Annals*, 1898, No. 3, p. 162.

The Treatment of Chronic Enteritis.—DR. E. P. HERSHEY reaches the following conclusions: This is an affection impossible to overcome just so long as irritation continues. This irritation is due mainly to fermentative changes brought about by pathological conditions in the intestinal glands, resulting in vitiated secretions. The prevention of excessive fermentation takes away the irritation and allows the uninterrupted restoration of the glands affected. This result is best accomplished by means of a remedy that will act locally upon the glands and will prevent excessive fermentation. The two best-known remedies for this purpose are beuzonaphthol and bis-muth tetra-iodo-phenol-phthaleinate, the latter having the advantage over the former that it persists in being a local remedy in the intestinal canal, whereas the former, though acting locally, liberates benzoic acid in sufficient quantities to become sooner or later a renal irritant. Finally, the latter remedy is one well worthy of a thorough trial in the treatment of typhoid fever.—*Western Medical and Surgical Gazette*, 1898, No. 4, p. 203.

The Therapeutic Value of Spleen Extract.—DR. A. CAMPBELL CLARK states, in brief, that this substance aids digestion and nutrition, increases the cutaneous circulation, and stimulates the glandular activity of the skin. In a series of patients suffering from most intractable conditions—chronic inertia, mental and physical—treatment lasting over a year resulted in no mental improvement in several, slight in a few, and recovery in a few male cases. In another series, including recent instances of insanity—the mental breakdown being due to physical exhaustion, patients suffering from prolonged lactation, puerperal weakness, anæmia, anorexia, and nervous exhaustion—the results were more prompt and decided in the majority, not only physically, but soon after mentally, some being restored completely, while of a greater number it could only be said that they were improved. The results as to special points were as follows: (1) Pulse and temperature. The character of the radial pulse, as judged by sphygmographic tracings, taken before and several times during treatment, has not yet been definitely determined. In this investigation they point rather toward a lowering of blood-pressure than the reverse; but they do this in no decided manner. There is no doubt that it increases the pulse-rate from 5 to 15 per cent. and raises the temperature from $\frac{1}{2}^{\circ}$ to 1° in the majority of cases. (2) Appetite and digestion. In some the appetite was improved; in many more digestion improved, without any relish for food. This is probably due to the fact that this substance is rather nauseating to some. In some instances increased salivation has been noticed. (3) Bowels and urine. In a few instances it appeared that the bowels were more active than formerly; in others no change was observed. Further attention should be directed to the urine. (4) Weight. While rise of weight in some instances was phenomenal, in others it was very moderate. One positive fact came out clearly, namely, that increase in weight, however slight, was the rule, and the exceptions were very few. (5) Blood. The results have been inconclusive in the case

of male patients, with two remarkable exceptions; but on the female side positive improvement was more uniformly observed. This is probably due to the fact that their blood was poorer to start with, and hence the improvement was more manifest. (6) Effect on skin and hair. Increased color and warmth of skin have been noted, also softness and elasticity; in some a slight oily feel, in others a moist condition, due evidently to gentle perspiration. It is not merely a case of determination of blood to the skin, for it is quite clear that there is also an increase of secretory activity. The increased warmth probably accounts for the slight increase of axillary temperature. In almost all the patients the change in the face has been most noticeable; rubbing the skin of patients who previously showed little or no reaction is followed by a glow of warmth and color. Improved complexion was noticed in pale, cold, anæmic women, in women with dry, sallow skins, and in pale-faced men. No conclusions have been arrived at regarding the hair, but thus far the results are rather positive and favorable than negative. (7) Mental effects. It would be premature to say that we have here a direct brain stimulant, for the data are still insufficient and may prove elusive; but there can be no question of this, that mental changes, sometimes of an abnormal character, form striking incidents in the course of treatment. Exhibition of temper was quite noticeable in both sexes, but much more in the male sex; and it seemed, in several male adolescents who had lapsed into stupor, that this drug had an awakening influence. The most potent preparation was an emulsion of the ethereal extract, of which each fluidrachm represented five grains of extract. The largest dose was one drachm four times daily.—*Edinburgh Medical Journal*, 1898, No. 512, p. 152.

In a second paper the author emphasizes the importance of taking the remedy on an empty stomach half an hour before meals. While there may yet be reasonable doubt as to the manner in which spleen extract acts physiologically, and much conjecture as to the particular class of mental cases that should be submitted for this treatment, it is evident that its action on the male sex is somewhat different from its action on the female sex. The male adolescent seems to be particularly susceptible to the action of this remedy. It may be that the spleen extract, in addition to other effects, has a direct influence on the sexual centres, and through them excites emotional disturbance; but whatever the explanation, the fact remains that several male adolescents put under this treatment in this asylum—all of them lethargic and stuporose—have shown a marked reaction of a mental character. In several cases this has taken the form of mental excitement, sometimes attended with hallucinations; in one case the mental excitement was severe, impulsive, and violent; in another it was that of exaltation, with chatty irrelevancy, and perfect good nature, and along with it there was exaltation of appetite and an increase in weight. In others there has been a mild excitement, with occasional spurts of irritability and displays of temper. These results have been obtained not infrequently in the case of patients who had been addicted to self-abuse, but in whom the habit was suspended owing to nervous exhaustion. It has not been found that the habit was again resorted to under the influence of spleen treatment, except in one case, which afterward recovered. Taking all the male cases together, one cannot resist the conviction that spleen extract is potent as a mental agent as well as a

purely physiological one. In the case of female patients put under this treatment there are sometimes, but not so frequently nor to the same extent, observed spurts of irritability and temper; but attacks of excitement, however mild, apart from these spurts, have not been noticed in any of the female cases. The mental aspect of the therapeutics of spleen extract is very interesting, and has yet to be worked out more fully.—*Medical Press and Circular*, 1898, No. 3068, p. 185.

Generalized Erythema Following the Ingestion of Calomel.—M. CAMES-CASSE reports that an old woman, suffering from irregular heart-action resulting from a long-standing mitral insufficiency, received five doses of two-thirds of a grain of calomel at three-hour intervals on alternate days for a week. The drug was given with a small amount of sugar of milk in sweetened water. The patient was upon a milk diet, and received a simple elyster each morning. Moderate purgation and considerable diuresis ensued, with consequent diminution of anasarca and dyspnoea. Upon the day following the first day's use of the drug there was noticed a slight burning over the entire body, but especially over the face, neck, and hands. The second day redness appeared. At the end of the week the burning was atrocious, the entire surface of the skin was scarlet-red, violet in places, swollen, and thickened. The hairy-scalp remained uncolored. The palms and soles were less colored than the other surfaces, but yet were red. In a few days spontaneous cure appeared, but accompanied by an abundant and extraordinary desquamation which extended to the hairy scalp and to the mucous surfaces. First, large surfaces were detached, then small scales, and finally a whitish powder. This process lasted fifteen days, although the mucous surfaces were healed at an earlier period. There was not any elevation of temperature, nor did the redness of the mouth resemble a mercurial stomatitis.—*Bulletin Général de Thérapeutique*, 1898, 1e liv., p. 20.

The Value of Potassium Permanganate as an Antidote for Opium and its Alkaloid, Morphine.—DRS. E. Q. THORNTON and CHARLES A. HOLDER state that there are but three possible ways in which the antidote may overcome the poisonous effects of opium: 1. Chemically, by coming in contact with the alkaloids in the blood, and thereby oxidizing them. 2. By acting as a physiological antagonist. 3. Mechanically, by giving rise to severe pain, which follows the ingestion of potassium permanganate, thereby assisting in keeping the patient awake. The usual fatal dose of morphine, estimated according to the body-weight, was administered subcutaneously to six dogs, which resulted in their death in from two to three hours. In test-tubes two grains of potassium permanganate were required to reduce one grain of morphine, so that the amount of antidote was calculated on this basis. This was also administered hypodermatically, at periods ranging from a few minutes to an hour after the poison had been administered. Five dogs so treated died as promptly as those which had received no permanganate, nor did the poisonous effects of morphine appear in any way to be modified. One dog received less than a toxic dose of morphine, and, although followed by permanganate, it did not appear to modify in any way the usual non-toxic effects of morphine. Lastly, a large dose of potassium permanganate was

given subcutaneously to a dog which had not received morphine; and, with the exception of the pain, which lasted about thirty minutes, the animal appeared to suffer no inconvenience, and recovered fully. These experiments lead to most serious doubt as to the efficacy of potassium permanganate as an antidote to opium or any of its alkaloids when hypodermatically injected.—*Therapeutic Gazette*, 1898, No. 1, p. 11.

Some Effects of Cannabis Indica in Large Dose.—DR. ROBERT C. BICKNELL regards as worthy of note the existence of muscular contractions, followed later by convulsive movements, evidently due to action of the drug on the spinal cord. Aside from acceleration of the pulse-rate and a feeling of fulness in the artery at the wrist, there was, just previous to the occurrence of unconsciousness, a sense of extreme tension in the abdominal blood-vessels; they felt distended almost to bursting. After some hours the urine was markedly increased in quantity. No constipation resulted. There was no foreboding nor fear of impending death.—*Therapeutic Gazette*, 1898, No. 1, p. 13.

Strychnine Poisoning.—DR. A. HUBEL reports that two hours after intentional ingestion of this drug he thoroughly washed out the stomach, gave strong coffee and ten drops of tincture of iodine every two hours. Later, he administered seventy-five grains of potassium bromide. Recovery followed. The notable conditions, aside from the usual symptoms, were in this instance the elevation of temperature on the first day, the retention of urine, and the appearance of blood and casts in it. The first is explained by the enormous activity of the muscles; the urinary retention by the spasm of the *sphincter vesicæ*. The blood and casts can be explained by the irritation which strychnine in large doses produces in the kidney. During convalescence the influence of strychnine upon metabolism was marked in that the chlorides and phosphates were markedly diminished at the commencement, but increased daily in amount, while the urea remained constant as in normal urine.—*Münchener medicinische Wochenschrift*, 1898, No. 1, S. 7.

Liquid Benzoin for Benzoinating Lard.—MR. RICHARD M. SHOEMAKER, noting that the benzoin of commerce is largely adulterated, macerates for twelve hours benzoin, 20, in ether, 40, filters, and dissolves castor-oil, 15, in the filtrate, from which the ether is carefully distilled. This oily product contains the benzoic acid and the volatile principles. To make benzoinated lard, white wax, 20, is melted by steam-heat with dehydrated lard, 965, to eliminate water; the above liquid, 15, is added and the mixture stirred until cold. In warm weather a larger amount of wax should be used.—*American Journal of Pharmacy*, 1898, No. 1, p. 9.

Electrotherapy in the Treatment of Certain Forms of Neurasthenia.—DR. G. APOSTOLI states that each method of using electricity will have its special indications and contra-indications. Speaking generally, local applications, whether of faradism or galvanism, should be second to the general, which may be static baths or baths of rapidly alternating currents. The more that neurasthenia is complicated by peripheral nervous trouble (such as

hemianæsthesia of hysterical origin), the more serviceable will be the electric treatment, which gives local maximum of tension (static or franklinization). In the arthritic forms, on the other hand, when the nutritive processes are impaired, the currents influencing cellular activity or currents of high frequency are indicated. The choice of method for each patient is confirmed by the tolerance or intolerance of the patient, as shown by the progress of the treatment. The hysterics who show diminished cutaneous excitability are only suitable for static electricity. This bath, aided perhaps by the drawing of sparks from the spine, is well borne, and generally benefits. The hyperæsthetic hysterics need the same treatment, but in moderate doses of short duration and without practising revulsion (sparks). The arthritics, as well as others whose nutrition is defective, are generally very sensitive to static sparks, bear this treatment badly, but are benefited by treatment of high frequency. In neuro-arthritics both methods may be combined.—*Bulletin Général de Thérapeutique*, 1898, 4c liv., p. 148.

Antipyrin in the Treatment of Epidemic Influenza.—DR. L. LANDOUZY calls attention to the fact that this drug has its only indication in the relief of pain; further, that it is often harmful in the asthenic forms of this disease. It depresses the nervous system, lowers vascular tension, produces peripheral vaso-dilatation, destroys red blood-corpuscles in patients suffering from fever, diminishes oxidation, diminishes the quantity and solids of the urine, and, finally, lowers the urotoxic coefficient. These dangers are specially encountered in old persons, those suffering from arterio-sclerosis, cardiac disease, emphysema, or those who excrete albumin in their urine. Far preferable is quinine, which often relieves the pain in many instances and also stimulates and builds up these patients.—*La Presse Médicale*, 1898, No. 10, p. 57.

Results in the Treatment of Tuberculosis with Anti-tuberculosis Serum.—DR. E. A. DE SCHWEINITZ states that when tuberculin failed to give satisfactory results as a curative agent, attention was directed to the preparation of a serum on the same principle as the diphtheria antitoxic serum. Margliano, Babes, Behring, and others prepared such a material for the treatment of tuberculosis by injecting tuberculin alone or in combination with virulent tubercle cultures. After long-continued injections of animals the serum obtained was claimed to have antitoxic properties, and when this serum was injected subcutaneously into tuberculous animals, together with a dose of tuberculin, the fatal effects or characteristic rise of temperature from the latter were counteracted. The strength of the serum was based upon the quantity necessary to prevent the tuberculin reaction. This method, however, did not fulfil all the conditions. In the first place, as tuberculin is prepared from the cultures of the germ it is subjected to such a temperature that some of the products of germ-life are changed or decomposed, and hence tuberculin as used does not represent the poisons of the tubercle germ as they are actually found in animals suffering from this disease. Consequently, a serum which counteracts the fever-producing properties of tuberculin does not necessarily exert a beneficial influence upon all phases of the disease in man. Assuming that, while it may not be possible

to establish a perfect artificial immunity to tuberculosis in man, but that the disease may be checked by reinforcing the natural resistance which is always present, the effort has been made to secure in a slightly different way from the one above described a serum useful for treating tuberculous. In the first place, it was found, if an originally virulent tubercle bacillus was cultivated for many generations upon artificial media, that, while it did not lose the property of producing active poisons when so cultivated, it did lose the property of producing tuberculosis in animals when the latter were injected. Furthermore, the animals, as guinea-pigs, after a time possessed a very marked resistance to tuberculosis when they were subjected to an inoculation with virulent tubercle bacilli that would cause disease and kill the checks in a month to six weeks. This attenuated germ seemed to offer suitable means for treating animals for the production of a serum with active properties, and was used in large quantities upon both cows and horses. The entire culture medium, including the germ, was at first used for these injections. As the toxins of the tuberculosis germ are, however, found to a large extent within the cell-wall, it seemed desirable to bring these into solution so far as possible and inject the animals with the extract. At the same time it should be advantageous to discard the excess of nitrogenous bases, glycerin and peptone, present in the culture media and unused by the germ. To accomplish this solution an ordinary milk-shake machine has been used. The live germs in quantity are transferred to the sterilized tumblers, and the liquid added which it is desired to use as a solvent. The whole is agitated as rapidly as possible until the cell-contents have been pretty well extracted. The residual germs can then be separated and submitted to the same process. This germ extract, as it may be called, containing the soluble products of the cells, is then used for injection. As the germs have not been submitted to a temperature above that at which they have been grown, this solution should contain the unchanged products of the cell life. This material is fairly well absorbed by the animals. The serum obtained by cows treated with a large amount of cultures had apparently little or no value in checking tuberculosis in experimental animals. The serum obtained from injected horses was at first without any apparent influence; but as their treatment progressed, and more and more germ extract was injected, the serum gradually acquired properties of value. When given to tuberculous guinea-pigs, together with tuberculin, the serum would usually retard or prevent the characteristic reaction, and in addition prolonged their lives for a number of months. These results seemed to warrant the use of the serum upon man. The results of the use of this serum in connection with general hygienic and climatic treatment only, as shown by the histories of thirty-four patients, were as follows: Physical signs improved in thirty; expectoration decreased in twenty-eight; temperature decreased in twenty-one; cough decreased in twenty-six; appetite improved in twenty-seven; tubercle bacilli disappeared in four, decreased in seven, and remained stationary in twenty; body-weight increased in twenty-four. Of these patients the disease was in the incipient stage in sixteen; moderately advanced in fifteen; and far advanced in three instances. These patients, compared with those treated in other ways, or under climatic influence only, showed that the improvement with the use of serum was more marked. A review of the work

in general seems to warrant the theory that the value of so-called antitoxic scrums lies in the fact that they contain in solution one or more soluble ferments which are able to digest and destroy in the animal body the toxic products that the germ forms. These ferments are probably secreted by the leucocytes or other cells acting under the stimulation of the toxins first elaborated by the germ of the disease. In the case of a germ like diphtheria, probably the secretions of only one ferment will be stimulated, while in the case of tuberculosis, where a larger number of toxic substances are produced, it is probable that several ferments are needed to counteract their effect. Whether further application of the serum treatment in its present form will continue to prove beneficial, and give better results, or whether this must be materially modified, cannot at present be determined. The results obtained certainly show that the efforts are properly directed. Perhaps it may be possible to prepare antitoxins by artificial means outside of the animal body; but it seems, from present results, at least, that the active live cell and the intervention of the laboratory of the animal body are necessary adjuncts in the production of these curative substances.—*The National Medical Review*, 1898, No. 10, p. 281.

Tuberculin R.—DR. W. KERNIG has made use of this substance in nine instances of pulmonary tuberculosis. He finds that it gives rise to the same symptoms as the first tuberculin. So far as can be determined, it contains the same poisonous substances, and for patients it is a dangerous remedy. The concentration is the greatest possible, so that in lupus there was ocular demonstration of its vigorous action. The study of the clinical histories is not favorable to its continued use.—*St. Petersburger medicinische Wochenschrift*, 1898, No. 7, S. 53.

MEDICINE.

UNDER THE CHARGE OF

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Myelin in Sputum.—A. SCHMIDT (*Berliner klin. Wochenschrift*, 1898, No. 4) shows that the so-called myelin drops in sputum occur even in the morning expectoration of persons in perfect health, but not in the secretions of the nose and throat. Purulent sputum is free from it, as is also the sputum from cavities, and in pneumonia and abscess. Along with myelin drops there are also coagulated cells, like those first described by Nothnagel in certain diarrhoeal discharges. Schmidt opposes the oft-quoted view of Panizza, that myelin is clinically nearly related to mucus. Experiments made by him and his pupils have shown that it is identical with protagon, found

originally in medullary nerve matter. He thinks the myelin is formed in the secretions from protagon excreted from the lung in some other state.

Diuresis, instead of Critical Sweat, in Pneumonia.—REUSNER was led to this by noting the good effects of certain diuretics given as a last resort to patients apparently dying in pneumonia. As severe sweating is exhausting, especially to the heart, efforts to lessen it in the crisis of pneumonia seemed to him rational. Accordingly he gave sodium and caffein salicylate (grm. 0.15) and camphor (grm. 0.1) every two hours. Excretion of urine was much increased. Sweating occurred, though rarely. The treatment was used only in severe cases. The author suggests some explanations of the cause of the sweating, without coming to a conclusion.—*St. Petersburger med. Wochenschrift*, 1898, No. 2.

Muscle-callus.—STRAUSS (*Berliner klin. Wochenschrift*, 1898, Nos. 5 and 6) distinguishes three groups of cases. 1. Those with fusing together of the muscles with each other and with neighboring tissues, usually in the leg or thigh, without discoverable cause, and acute or chronic. 2. Cases in which a single muscle is involved in its whole extent. 3. Cases with solitary or multiple nodes in a single muscle, the muscle-callus *par excellence*. Mixed forms are not rare, but the cases in the first group are, perhaps, essentially different from the others. Strauss has seen eight cases himself, and confirmed the diagnosis by examination of excised tissue in two. All the patients were otherwise well, and had no history of internal disease that could be brought in relation with the muscular change. Most of the patients were of middle age. They complained of tearing pains in the affected extremities, and ascribed these to "cold." Trauma and syphilis were denied by all, as also excess in alcohol. All were disabled by the pain or by weakness of the affected part, and had been treated for sciatica or rheumatism. Examination showed diminished active mobility, with no hindrance to passive motion, but the latter was followed by pain and contraction of certain groups of muscles. There were no painful spots over the nerves. The electric excitability was not altered. Palpation of the affected muscles revealed circumscribed, hard, inelastic, movable masses, of varying sensibility, usually solitary, at times multiple. The masses had the shape of dates or nuts. Sometimes they creaked on pressure, and at times pressure caused eccentric or radiating pain. The peculiar hardness and other physical characteristics of muscle-callus which have been mentioned by many writers require for their detection considerable skill in palpation and an accurate knowledge of the consistence of normal muscles. The examination is best made by having the patient relax the muscles, and by trying to roll the suspected part between the thumb and fingers, or to press it against the underlying bone. Contractions of the muscles are readily brought on by too energetic palpation. Here the elasticity, the absence of a nodular surface, and the variable position of the tumor at different times serve to prevent error. Varices in the muscles, not uncommon in the legs, and sometimes associated with sciatica and muscular cramps, not infrequently cause confusion, especially when the varices are thrombosed. The presence of superficial varices should lead to the correct diagnosis. Gum-

mata, malignant tumors, tuberculous masses, and calcified trichinæ must be excluded by a complete examination. Anatomically, the process consists of an interstitial myositis. In an acute case observed by the author, numerous small tumors appeared and disappeared in the course of a case of lead colic. An excised tumor proved to be made up chiefly of granulation tissue. In contrast to the syphilitic myositis, which affects especially the biceps, and certain occupation calluses in the adductors of the thigh and arm, the calluses now described occur most frequently in the muscles of the calf and in the trapezius, especially near the insertions. As to the cause of the disease, the author discards the idea of rheumatism, on account of its vagueness, but leans toward an infection of some kind. As to treatment, local massage was useful in many cases, especially those seen early. It may be combined with baths and compresses. In obstinate cases excision may be necessary.

Lipuria in Hysteria.—L. CASPER reported to the Berlin Medical Gesellschaft (*Berliner klin. Wochenschrift*, 1898, No. 5) the case of a woman, aged twenty-three years, who, for two years, had been treated for a severe illness, characterized especially by pain in the right renal region and with occasional colic. The right kidney was barely palpable. The urine was opaque, acid, and contained albumin and fat in fine drops. This continued for several days, but when taken finally per catheter the urine was clear and free from fat. Repeated catheterization was always negative, though urine passed in the intervals always contained fat. As it was impossible to discover the method of adulteration, the bladder was filled with a boric acid solution. In the mean time a bottle containing sour milk was found in the patient's clothing. Some potassium iodide was put in the bottle and the latter replaced. The patient, being left alone, then passed the boric acid solution, which contained fat and gave the iodine test. The author suggests that many previously reported cases of chyluria or lipuria have originated in a similar manner.

Chlorosis.—E. GRAWITZ (*Fortschritte der Med.*, 1898, No. 3) gives a critical review of recent publications on chlorosis and an expression of his own views on the nature of that disease. He accepts as settled the low hæmoglobin with relatively high corpuscle-count, at least in so far as the present methods of examination are concerned. But he considers a relatively diminished mass of red corpuscles and relatively larger proportion of plasma much more important in determining the real cause of the disease. In marked contrast to pernicious anæmia is the absence of degenerative changes in the red cells, of evidences of increased activity of the bone-marrow and of changes in the number and proportions of the leucocytes. Not to be neglected are the evidences of increased fluid in the tissues of the body, including the œdema of the retina, shown by Romberg, and the increase of diuresis in recovery, shown by Von Noorden. From these and other facts, Grawitz looks on chlorosis as the symptom of a general neurosis, in which the anemic blood in turn causes many other symptoms. He ascribes the altered composition of the blood to a morbid function of the vasomotor nerves, leading to polyplasmia, lymph-congestion, and imperfect development of red cor-

puseles. That chlorosis occurs especially at puberty, while older women with neuroses, especially hysteria, have usually an ordinary anæmia, he explains by assuming that at the time of development of the female sexual organs the vasomotor nerves are especially disposed to disease, just as in still earlier periods the motor functions are affected, as in chorea.

Hemicrania, Unilateral Paralysis of the Cervical Sympathetic, and Basedow's Disease.—L. JACOBSON (*Deutsche med. Wochenschrift*, 1898, No. 7) reports the following: A woman, aged thirty-eight years, had hemi-crania for many years. The attacks came on every four weeks, lasted two days, with pallor, nausea, and vomiting, and after the vomiting subsided. There was no relation with menstruation. After sixteen years the attacks ceased on the left side, but began on the right. They recurred every two weeks, and were much more severe than before. On examination it was found that the left eyelid could not be so widely opened as the right; that the left bulb was deeper in the orbit than the right, the latter not being prominent. The left pupil was half as wide as the right. Both reacted well to light and accommodation. The right side of the face was red and moist, the left pale and dry, though the difference was not equally marked at all times. It was especially plain when the patient became overheated. The left cheek was atrophied. The thyroid was enlarged, especially on the right side, but varied much in size at different times, and was larger when there was palpitation of the heart. There was no murmur over the thyroid. There was a distinct, quick tremor in the hands. The pulse was from 120 to 160, or more, usually regular and full. The heart was not enlarged, the tones pure. Palpitation was often present, associated with a feeling of anxiety in the heart region, and with increase of the size of the goitre and of the tumor. The face was strongly pigmented. The patient was easily excited. The condition of the face was first noticed about eight years before. The patient was certain there was no unusual redness before the pallor appeared. The author discusses the various points suggested by the case. The pallor of the face is difficult to explain in association with the paralysis of the sympathetic, unless we admit that the nerve contains both dilating and contracting fibres. The Basedow's symptoms the author looks on as merely the results of a widespread vascular disease having its origin in the cerebellum.

[The absence of a murmur over the enlarged thyroid is very common in incomplete cases of Basedow's disease.—ED.]

Traumatic Myocarditis.—MENDELSON (*Deutsche med. Wochenschrift*, 1898, No. 7) treated a man, aged twenty-six years, who was badly squeezed against the stall by an unruly horse. Next day he was unable to work and had pain in the chest, which grew less by degrees, but left a permanent burning sensation, unlike that of pleurisy. Later, dyspnœa came on, and three weeks after the accident, after having to stand half an hour, the man fainted. Mendelsohn found him cyanotic, the pulse small, frequent, and very arrhythmic. The heart-sounds were pure, the second sound at times accentuated. The heart was enlarged on both sides. At times there was œdema of the ankles, which disappeared under digitalis. Investigation of the military records and of the records of the hospital where the patient had been treated

for pleurisy, showed that the heart presented no anomaly before the accident. Mendelsohn thinks that in addition to the traumatism there was a strain on the heart from the struggle, and that this, with the anxiety of the man's critical position, was important in the production of the lesion.

Tuberculous Endocarditis.—BENDA (*Deutsche med. Wochenschrift*, 1898, No. 7) records a remarkable example of this. A boy, aged ten years, died of acute miliary tuberculosis following hip disease. The numerous recent tubercles in all organs pointed to a blood-infection, but examination of the veins showed no point of entrance. There was a warty endocarditis, and on the mitral valve, besides the fine translucent granulations, there was a rough yellow nodule the size of a hempseed. This was composed of a vascularized granulation-tissue with epithelial cells, but with no giant cells. The free surface showed irregular necrotic areas, partly caseous and partly hyaline, with enormous numbers of tubercle bacilli. A zone half a millimetre in thickness consisted wholly of colonies. That this was the source of the general infection cannot be doubted.

Dental Caries and Soil.—The intimate relation of dental caries with other important diseases makes interesting a reference to certain observations of C. ROSE, which have recently been confirmed in Sweden. A year ago Rose claimed, as the result of the examination of the teeth of 20,000 Bavarian recruits, that the harder the water and richer the soil in lime and magnesia, the better the teeth. Forberg reported the Swedish results at a recent congress of dentists. Examinations of the teeth were made by various dentists in different parts of Sweden. In that country the racial and economic conditions are tolerably uniform, but the hardness of the water varies greatly. A constant increase of the proportion of carious teeth was found to coincide with the diminishing hardness of the water, so that with a hardness of 12° there were 15.4 per cent.; with a hardness of 0.5°, 25 per cent. of carious teeth.—*Münchener med. Wochenschrift*, 1898, No. 3.

Typhoid Fever without Intestinal Lesions.—NICHOLS and KEENAN (*Montreal Medical Journal*, January, 1898, p. 9) report the following case of typhoid fever without intestinal lesions: The patient came to the out-door department, stating that for about two months he had been suffering from headache, loss of appetite, and general weakness. Had been forced to give up work several times.

On admission his temperature was 103.6°, pulse 104, and respiration 36. Tongue was coated and dry; abdomen distended, tense, and tender. Fading rose-spots were visible, and the spleen was palpable. Bowels constipated. There was some impairment of the percussion note in left axillary region. The blood gave the typical serum reaction. The patient gradually failed, and death occurred thirteen days after admission. Blood-cultures taken before death were negative.

The chief points in the autopsy report are as follows: Spleen was dark-red and pulpy. Cultures from the spleen gave a bacillus which fulfilled all the requirements of Eberth's bacillus. The intestines were entirely free

from ulceration, although the lowest three Peyer's patches in the ileum were slightly raised, but showed no signs of ulceration. There was no evidence of healed typhoid ulcers. Mesenteric glands were generally enlarged, congested, and succulent, especially about the ileo-cæcal region. Left lung showed broncho-pneumonia. Cultures from the liver were positive for Eberth's bacillus. Blood cultures taken at the autopsy were negative.

A search of the literature for the past ten years showed only nine cases of typhoid fever without intestinal lesions, which had been confirmed by the discovery of Eberth's bacillus. A number of other cases are reported, which, however, are not included, owing to the lack of corroboration by bacteriological investigation.

Typhoid without intestinal lesions falls clinically into three main classes:

1. Typical typhoid, minus the ulcerations.
2. Spleno-typhoid.
3. The nervous type, with extreme intoxication.

The cases of the first type are rare. Diarrhœa may be present. Three of the nine cases belong to this group.

The second type was first described by Eiselt. It is characterized by an excessively large spleen, often with acute perisplenitis and fever of a recurrent type. The writers state that some of these cases do present ulceration of the intestines, but it is often absent. Two of the nine cases belong to this class.

The third class, due to severe intoxication, are characterized by extreme prostration, delirium, coma, sometimes hyperpyrexia, degenerative changes in the vascular system leading to purpura, hæmaturia, melena. Jaundice is sometimes present. Many of these cases are, no doubt, examples of secondary septic infection. This class includes the rest of the nine cases, including the one the writers report.

Nichols and Keenan discuss at considerable length the possible explanations for the absence of intestinal lesions in typhoid. Three hypotheses must be considered. First, one must think of the possibility of infection through some avenue other than the intestine, as, for example, the respiratory tract. In such cases the brunt of the disease might fall on the lungs, and the intestine escape. Secondly, certain ptomaines derived from the gastro-intestinal tract, either circulating in the blood or present in the intestinal mucosa, act so as to neutralize the local action of the typhoid virus and bring about intestinal immunity. Finally, it may be assumed that toxins derived from germs other than typhoid may antagonize their virus, and a local immunity be thus acquired.

On the Coincident Occurrence of Epilepsy and Diabetes Mellitus.—EBSTEIN (*Deutsche medicinische Wochenschrift*, 1898, No. 1, S. 3, u. No. 2, S. 22) published a communication bearing on this subject in the *Semaine Médicale*, May 6, 1896, based on a case which came under his personal observation. Since then four other cases have been observed, the notes of which are here recorded. Three possibilities present themselves in considering the association between epilepsy and diabetes mellitus. First, the epileptiform attacks may be caused by some toxic substance occurring in diabetes; second, the diabetes mellitus or glycosuria may be a result of the

epileptiform attacks; and, thirdly, both epilepsy and diabetes mellitus may be dependent upon some common etiological factor.

Considering the first possibility, Ebstein states that it is not unreasonable to suppose that convulsions, due to the toxic influence of the products of metabolism, might be expected to occur in diabetes mellitus, just as convulsions occur in the uræmia of nephritis. Personally, he has never observed such instances. Reference is made to a case recorded by Finlayson, in which repeated convulsions occurred in a case of diabetic coma seventeen hours before death. Dreschfeld observed convulsions once in sixteen cases of diabetic coma, and in eighty cases of this complication of diabetes collected from the literature convulsions occurred in six instances. G. W. Jacoby considers the epilepsy in diabetics to be an intoxication epilepsy due to the circulation of acetone in the blood, and terms the condition *epilepsia diabetica*.

Those cases of diabetes mellitus which may be said to have been occasioned by the epilepsy may be divided into two classes: first, cases in which temporary glycosuria occurs after the epileptiform seizure; and secondly, those in which a more or less permanent glycosuria or diabetes mellitus ensues. Ebstein has never seen either a temporary or permanent glycosuria which could be attributed to the epileptiform seizures, and Griesinger's experience agrees with his own.

The third possibility, namely, that the diabetes and epilepsy may be dependent on some common cause, and not one on the other, is then discussed. The causes in these cases may be general or local. The most important of the general influences is heredity and a family predisposition, which plays so great a part in the etiology of both diabetes and epilepsy. Ebstein's first observation illustrates the effect of heredity. The patient's mother had softening of the brain and a brother epilepsy, though no diabetic history is stated to have been obtained. The patient had both diabetes and epilepsy, the latter appearing much later than the former, though, as Ebstein thinks, not dependent upon it. Ebstein states that although cases of diabetes and epilepsy are not uncommon in members of families with neurotic histories, yet it is a point worthy of note that these two diseases rarely make their appearance simultaneously.

The second and third of Ebstein's observations illustrate those cases where the epilepsy and diabetes result from a common local cause, in these particular instances a localized brain lesion. Both were cases of Jacksonian epilepsy, associated with diabetes mellitus decipiens intermittens. The amount of sugar was in both instances very small, and appeared intermittently. In Case 2 the largest quantity of sugar excreted in the twenty-four hours was only 8.8 grammes, while in Case 3, 14.5 grammes was the largest quantity excreted. His fourth case was one in which the epileptic symptoms began apparently as a *petit mal*, developing later into a *grand mal*. In this case also the diabetic symptoms were intermittent in character. The amount of sugar is not stated.

The urine examinations in Cases 2 and 3 were made with the greatest care. Daily analyses extending over months are recorded. Ebstein states that in these cases greater care in performing the sugar-tests is required than is usually observed in examining for sugar. Not only must daily examina-

tions of the urine be made, but each amount of urine voided should be analyzed, otherwise sugar is likely to be overlooked in the urine. From his personal experience Ebstein is led to believe that glycosuria or diabetes mellitus decipiens intermittens will be found more frequently in epilepsy, especially the Jacksonian type, than heretofore, if due care in making the urinary examinations is exercised.

Spontaneous Rupture of a Fatty Heart.—GREIG (*The Canadian Practitioner*, February, 1898, p. 81) records a case of rupture of the heart occurring during the act of passing a soft-rubber stomach tube for purposes of lavage in the treatment of a gastritis from which the patient was suffering. The patient was a woman, sixty years of age, and not particularly stout. The tube had just been passed into the stomach, without any excessive retching or straining on the part of the patient, when suddenly a pallor spread over the patient's face and her eyes rolled up. Realizing that something had happened the tube was immediately removed, the patient was placed on her back, and every possible means used to resuscitate her, but she was dead. At autopsy the heart was found ruptured, but unfortunately it is not stated into which of the cavities of the heart the rupture occurred. Extensive fatty changes of the heart and liver were found.

Greig states that the case is a unique one, and so far as he could ascertain no similar case had ever been reported.

The Use of Sudan III. as a Staining in Clinical Microscopy.—RIEDER (*Deutsche Archiv für klinische Medizin*, Band lix., 3 u. 4 Heft, p. 445) highly recommends Sudan III. as a means of demonstrating fat, occurring normally in the tissues or as a product of tissue or cell degeneration. It is a diazzo-coloring material, and was first prepared by Nietzki in 1880. L. Daddi, of Turin, in 1896 first pointed out the value of Sudan III. as a means of demonstrating fat, which it stains a beautiful scarlet-red color. It is a light, reddish-brown powder, which is insoluble in water, but easily soluble in alcohol, ether, chloroform, xylol, fatty and ethereal oils. When fat is once stained with the dye, it retains it with great tenacity and is decolorized with only the greatest difficulty.

The technique of using the stain in demonstrating fat in histological and pathological sections is first dealt with. Rieder lays special stress on the advantage of using Sudan III. in staining fat particles in human secretions and excretions. Large fat droplets take a bright-red, and small droplets only a yellow or orange-red color. Strong solutions used for some time stain the fat a dark or scarlet-red, whereas weaker solutions yield a light yellow color.

In clinical work the stain is very serviceable in demonstrating fat in cases of lipemia, lipuria, and chyluria; also in the stomach-contents, in the feces of infants and of adults with icterus; in the sputum of patients suffering from bronchiectasis and lung abscess; and finally, and most important of all to the clinician, the fat in finely, coarsely granular and fatty casts and fatty renal epithelial cells in chronic parenchymatous degeneration of the kidneys.

Rieder recommends a concentrated solution of Sudan III. in 95 per cent.

alcohol. To demonstrate fat in the formed elements of a fluid under consideration—for example, the urine—equal parts of the staining solution, urine, and 96 per cent. alcohol are added together. The amount of each fluid that would one-third fill an ordinary urine pipette is sufficient. The sediment soon collects, and can be examined in the ordinary manner under the microscope. In order to get rid of the excess of the stain, 60 to 70 per cent. alcohol can be run under the cover-slip and be removed by using filter-paper. In the case of urinary sediments, the fat droplets in granular casts, fatty casts, and fatty degenerated epithelial cells stain a scarlet-red color, whereas the granules of albuminous origin are unstained.

Rieder states that Sudan III. is superior to osmic acid, as it only stains fat, while the latter gives a black tinge to many substances other than fat. He further demonstrated that eosinophilic granules were not fatty in nature by failing to get the proper reaction with this stain.

SURGERY.

UNDER THE CHARGE OF

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Lumbar Nephropexy without Suturing.—In order to avoid the destruction of tissue which necessarily follows the passage of any kind of suture through the parenchyma of the kidney, and to maintain the kidney in the desired position for a longer time than sutures are capable of doing, SENN (*Journal of the American Medical Association*, December 11, 1897) has performed the operation with gratifying success by the following method:

The kidney is exposed by Simon's vertical lumbar incision. As soon as the adipose capsule is reached the kidney is placed in proper position, and is pushed forward into the wound by an assistant. About half of the kidney should project below the lower margin of the last rib. With dissecting forceps and curved scissors the adipose capsule is excised over the whole posterior surface of the kidney. The kidney is now brought well forward into the wound, the cut margins of the adipose capsule are pushed away from the kidney until the borders are freely exposed, when the fibrous capsule is thoroughly scarified with a long needle. At this stage of the operation the lower pole of the kidney is grasped by its capsule with a French vulsellum forceps and brought well forward into the wound. With dissecting forceps, finger, and blunt dissector the lower third of the kidney

is laid bare and a strip of iodoform gauze about an inch in width, and composed of four layers of gauze, is placed underneath the lower end of the kidney and each end brought out over the respective wound margins. By making traction on the forceps and gauze strip the lower end of the kidney is brought sufficiently forward to rest in the lower angle of the external incision. During the operation the margins of the external incision must be well retracted. With a long strip of iodoform gauze the floor of the wounds is then carefully packed in a way to force the pararenal fat away from the borders of the kidney, leaving the posterior scarified surface of the kidney well exposed, when with the same strip of gauze this is covered and the whole wound well tamponed with another piece of gauze.

The strip of gauze holding the kidney is then tied over the iodoform-gauze tampon, which forms a wedge, and will effectually prevent displacement of the organ until firm adhesion has rendered any direct mechanical support superfluous. The two pieces of gauze are tied together and the wound is dressed in the usual manner. No part of the lumbar incision is sutured. The patient is then placed upon the back, and a firm compress, the size of an adult's fist, is placed over the kidney below the costal arch and held in place by a wide strip of adhesive plaster encircling the entire body. The patient is placed in bed with the pelvis slightly elevated, and is directed to remain in the dorsal recumbent position or side operated upon for at least four weeks, the time required for the formation of pararenal adhesions sufficiently firm to hold the organ permanently and securely in its new location.

At the end of five or six days the tampon is removed and the wound closed by adhesive plaster and appropriate dressing. The immediate and remote results have so far been entirely satisfactory.

On the Etiology and Treatment of Glandular Enlargements in the Neck.—The glandular enlargements of the neck are divided by MILLER (*Scottish Medical and Surgical Journal*, December, 1897) into six groups differing slightly from the usual anatomical division. 1. Those at the back of the neck, the *occipital* group. 2. Those behind the ear, the *mastoid* group. 3. Those in front of the ear, the *parotid* group, which may again be divided into the superficial and the deep. 4. Those under the jaw, the *submaxillary* group. 5. Those lying along the sterno-mastoid muscles, the *sterno-mastoid* group, which are divided into superior and inferior. 6. Those above the clavicle, the *supra-clavicular* group.

The author, in his paper, deals only with simple chronic and tubercular enlargements.

The enlargements are not generally noticed until they have existed for some time. The simple ones are usually found in a delicate child, possibly healthy in all other respects. The glands are almond-shaped, firm, not sensitive, freely movable, enlarging very slowly, and with a history of an acute or subacute attack of inflammation.

Tubercular disease has three distinct stages; the ones described are added softening, then liquefaction with final discharge. The author believes that in many cases there is a pre-tubercular stage, and that simple adenitis is often followed by the tubercular.

The groups of glands he describes receive their lymphatics from the areas surrounding them: the occipital from the posterior part of the scalp; the mastoid from the scalp and ear; the parotid from the front of the head, the ear, and several other parts. This group is further subdivided into the superficial and deep. The former glands are served by vessels from the front of the scalp; the external ear and meatus; while the latter are connected with the orbit, nose, pharynx, middle-ear, and upper teeth. The submaxillary glands derive their lymph from the cheeks, lips, mouth, and lower teeth. Of the sterno-mastoid groups which, along with the submaxillary glands, are the most frequently affected, the upper series is connected with the tonsils, pharynx, œsophagus, and larynx; while the lower ones are related to the deeper structures and are generally found to become affected secondarily to the upper ones. The supra-clavicular are connected with the intra-thoracic and axillary glands.

The clinical importance of these relations is the fact that the cause of the enlargement is usually found to be in these regions. Glandular enlargement has always a cause, which should be sought for and removed, if possible. If the cause be not removed, the enlargement will persist, and such persistence (the open door) may give occasion to tuberculosis. Persistent enlargement, after removal of all discoverable causes, generally means tubercular infection or a pretubercular condition; therefore, all persistently enlarged glands should be excised.

Forcible Straightening of the Spine in Pott's Disease.—Two interesting cases illustrating the results of this new method of treatment are reported by MURRAY (*British Medical Journal*, December 4, 1897), with photographic illustrations of the condition found in the spine two and three months respectively after treatment.

In the first case the disease had involved three of the dorsal vertebrae, completely destroying one of them. There was not the slightest evidence of repair, but the gap formed by the straightening had resolved itself into a "false joint," bounded by caseous and diseased tissue. There was no widespread tubercular disease and the cause of death, a pneumonia, could not be attributed to the operation.

The other case had suffered from spinal disease for about two years. She died from meningitis three months after the spine had been straightened. After death her back was found to be very "wobbly" at the seat of fracture. Though the child had been kept lying since the operation—that is, for three months—there was not the least evidence of repair nor any attempt at filling-in of the gap. There was general tuberculous, the immediate cause of death being tuberculous meningitis.

The author says, "knowing as we do the remarkable absence of new bone in tuberculous disease, the state of affairs found in the above case is in no way surprising; but, in view of these facts, it will surely be wise to stop operating for the present and await results, even if we have to wait for two or three years."

A Case of Ligature of the Innominate Artery for Aneurism.—GAY (*Boston Medical and Surgical Journal*, July 22, 1897) reports a case of ligation

of the innominate artery for an aneurism which involved the innominate, subclavian, and common carotid arteries. Three ligatures of braided silk were placed upon the innominate or just above the arch, and two others together a little higher up. Through defective sterilization of the silk the field of operation was infected and a sinus formed down to the ligatures. Hemorrhage occurred on the thirty-second day. It could be controlled by pressure, and was supposed to be secondary hemorrhage from the distal end, as the carotid had been pulsating for some days. The carotid artery was ligated, but the patient continued to have repeated hemorrhages and died on the forty-second day. The autopsy showed a ruptured innominate artery on the proximal side of ligatures, with an infected wound. The aneurismal sac was obliterated except a small cavity filled with clotted blood, fibrin, and serous fluid. The subclavian artery with its branches—thyroid axis, vertebral superior intercostal and submammary—were much dilated.

Mortality and Treatment of Acute Intussusception.—From a compilation of two hundred and thirty-nine cases of acute intussusception and a study of the methods of treatment employed, GIBSON (*Medical Record*, July 17, 1897) deduces the following as the best method of treatment:

Of the symptoms nothing of much importance that is new was discovered; the most constant symptom, and one that must be considered pathognomonic when present in a child and accompanied by abdominal symptoms, is a bloody discharge from the rectum. Its absence is not, however, to be taken as evidence that intussusception does not exist. The infrequency of fecal vomiting is also noted. In general, palpation of the abdomen yields definite signs of greater value than in other forms of acute intestinal obstruction. A clearly defined tumor may, in many cases, be recognized.

The total mortality for one hundred and forty cases operated upon with antiseptic precautions is 53 per cent. The first and second days show a mortality-rate inferior to the general mortality, while the four succeeding days show a steadily increasing mortality, in each instance greater than the average. After the first week the cases merge into the subacute variety. The mortality was more than double in cases where the intussusception was irreducible, as compared with cases in which reduction was possible. The age of the patient does not apparently play so marked a rôle in regard to mortality as has been supposed, as the author finds only a 4 per cent. difference between the different classes. The author believes that the mortality is due not so much to the tender age of the majority of the patients as to the condition, also that this latter circumstance should prevent us from being sceptical of the possibility of improving our results, and lead us to discard the prevalent belief that we are dealing mainly with a class of patients whose age alone will preclude a favorable result. The author believes that an improvement in our methods of dealing with intussusception will result in decreasing the mortality. To accomplish this result we must operate at the earliest moment, and that means refraining from wasting time in attempts at reduction by inflation per rectum, except in a very limited number of cases, and such an attempt to be made only with the determination to resort to abdominal section immediately if such inflation does not at once accomplish its purpose.

In regard to treatment, the author believes that a single attempt may be made in the first twenty-four hours to reduce the intussusception by a high injection. If the condition is one of very great intensity of symptoms, it will perhaps be wisest to refrain from making such an attempt, for the reason that even on the first day reduction alone will not be sufficient treatment for the existing pathological conditions. In the second twenty-four hours, while a certain proportion of cases will yield to mechanical treatment, its usefulness becomes still more restricted, as exemplified by twenty-eight cases occurring on the second day, when in four instances other procedures than reduction were found necessary.

After the second day the author believes that the possibility of relief is so small and the probability of doing harm so great that a preliminary trial of the enemata should be omitted. A small percentage of cases, which may be called the subacute variety, may in the latter days, say in the second week, offer conditions which might justify a preliminary trial of distention, where the symptoms point to a lack of severity in the local conditions, showing neither shock nor sepsis.

All preparations for operation having been made, the patient should be anesthetized and the outlines of the intussusception carefully studied. A rectal tube should be passed, care being taken that it does not double on itself. The ingested fluid should be allowed to run in by gravity, the pressure being gradually raised. It is probably best to have the patient's pelvis well raised. The operator should keep accurate track of the result by the sense of touch. His perceptions of the results should guide his judgment as to the necessary pressure rather than actual amount, but he must remember that after attaining a hydrostatic pressure of four feet, and even less with infants, he is treading on dangerous ground. Still, here even, conditions pertaining to the individual case must be his chief guide. If, as the result of the enema, the operator can absolutely recognize by the sense of touch that the intussusception has entirely disappeared, the operation may be *postponed*. If the intussusception recurs, operation is indicated.

In operating the author advises the use of mixed anesthesia, commencing with chloroform and changing to ether, believing that the change stimulates the patient and lessens shock.

Operation. The incision should be a median one and sufficiently long to permit of easy manipulation. If the intussusception has not been definitely located and is not immediately felt, systematic search should commence at the ileo-cæcal valve. If the cæcum is collapsed, we know that search must be directed upward. The intussusception having been found, it should be examined by inspection over its whole extent. The first glance may show that reduction is impossible or unwise. Attempts at reduction are best made in the direction of working the sheath away from the invagination rather than pulling the latter out; such a procedure often causes excessive tears of the gut at some adherent point. The abdominal cavity should be protected by pads. Should reduction be accomplished the gut should be carefully examined for any point of impaired vitality. If in doubt, gauze packing may be placed about the intestines, and sutures inserted in the abdominal wound, but not tied. Twenty-four hours will determine the question when the appropriate measures may be taken. If the intestine cannot be reduced,

its vitality must be determined. This is a point that requires great judgment. If there is doubt, treat it as the gangrenous variety.

The methods of treatment open to the operator are artificial anus, entero-anastomosis, partial resection, and typical resection. The artificial anus should be reserved for those cases whose general condition is so desperate that any further procedures must necessarily be attended by death. This is, however, true only of the small intestine, the large intestine offering better chances, though here the mortality is 50 per cent. of deaths following upon the operation.

Entero-anastomosis is a method that may be employed. Partial or atypical resection, or resection of the intussusception through an incision in the sheath, is an operation that is, under favoring conditions, simple and speedy, and sacrifices less intestine than a typical resection. Resection of the entire intussusception is probably more dangerous than the operation just mentioned, and will be employed less frequently the more generally the other form becomes known. It is preferable to the others when in entero-anastomosis there is hesitation at leaving a considerable portion of the gut to "take care of itself," or (rarely) technical difficulties in performing the entero-anastomosis, for resection of the invagination, failure to separate from adhesions, for either procedure if there is any suspicion relative to the non-septic condition of the intestines.

For the treatment of gangrenous intussusception the author recommends only: 1. Resection with immediate union of the divided intestine. 2. Resection with utilization of the divided ends for a temporary artificial anus.

The indications for one or the other operation are dependent upon the condition of the patient.

In after-treatment shock from loss of heat must be guarded against by keeping the patient warm in all stages and avoiding contact with moist cloths. Alcohol subcutaneously is advocated as one of the best stimulants, while strychnine is the drug next in importance. Camphor dissolved in olive oil is a most valuable subcutaneous agent. The subcutaneous injection of saline solutions is also favorably mentioned.

The Foreible Correction of the Deformity of Pott's Disease.—MENARD (*La Press Méd.*, No. 57, 1897), after a careful study of the effect of this method of reduction upon a number of cases in post-mortems, and a careful review of the respirative process as seen in pathological specimens, says that the method must be considered wrong if applied to all forms of Pott's disease irrespective of their situation and volume. It is impossible to estimate the consequences, and the greatest caution should be maintained in expressing an opinion as to the future usefulness of the methods.

It is impossible to calculate the accidents which may follow upon this forcible reduction. The result of this procedure upon the tubercular focus is not known; all that can be said is that in all other parts of the body traumatism aggravates osteo-arthritic tubercular disease, and occasionally gives rise to the formation of abscesses. One cannot be far from wrong in predicting grave complications as the result of this treatment. It is the general rule that no new bone is formed in the reparative process subsequent to tubercular disease of the vertebræ. There is nothing to authorize the belief

that in this case any bone will be formed to supply the enormous bone defect which is always present. Such bone-formation never takes place after tubercular disease anywhere. The law is that these defects are filled up and unions produced by fibrous tissue.

Ossifying Osteoperiostitis of the Metatarsals.—BUSQUET (*Rev. de Chir.*, 1897, No. 12) says that there are the following forms of periostitis: 1. That due to direct traumatism, primarily and immediate. 2. That due to indirect traumatism. 3. That due to various diatheses.

That to which he especially calls attention belongs to the third class, and he bases his remarks upon the question of whether it is possible to produce, by frequently-repeated pullings on the fibro-periosteal elements, an irritation of the periosteum sufficient to induce the formation of new tissue beneath the osteogenetic layer, and if a violent harsh knock is capable of producing a tear in fibre of the periosteum which should be followed by a periostosis.

This he believes to be possible, and that the affection he is studying is of the periosteum and bone, the latter being involved only to a slight degree.

Of the symptomatology, he says the affection is generally unilateral, but more rarely may be bilateral.

The osteoperiostitis attacks the three central metatarsal bones, and has never been observed in the first or fifth. This fact seems to differentiate this form of osteoperiostitis from the traumatic and diathetic. The three metatarsal bones involved constitute the metatarsal arch; they sustain all the shocks from above downward and those received laterally.

The patient complains of being unable to walk, and that his foot is swollen. Examination shows that the metatarsal region is the seat of an œdema, with marked acute pain, especially when the foot is placed upon the ground, resulting in a functional disability almost absolute. Outside of the metatarsals the foot appears sound, but careful questioning elicits the information that it commenced by a lesion that was at first trivial and transitory, but finally resulted in a change of rhythm in marching.

The symptom which predominates is the œdema. It is situated on the dorsal aspect of the metatarsals and only occupies this region in ordinary cases, showing itself on the plantar aspect in the more severe type.

The skin preserves the normal color and temperature; there may, however, be a slight hyperæmia and local increase in temperature. The volume of the foot is slightly augmented. Sometimes the pain, which in repose is usually *nil*, acquires such a degree of intensity as to preclude sleep.

The œdema gradually disappears after a variable length of time, the osteoperiostitis becoming much more evident in consequence. This happens quite rapidly when the patient is allowed to rest, with appropriate treatment. Pauzat has seen the tumor developed after four days, but more frequently it requires fifteen to twenty days.

The osseous tumors, once formed, remain stationary during a variable period; they are, however, indolent, and walking is possible. Nearly all of the patients under his care again commenced their service after four or five weeks of indisposition; they could do all their marching and had to be sent for to be seen later.

As complications, he cites arthritis of the metatarso-phalangeal, inter-

metatarsal, tarso-metatarsal joints. They are of short duration and disappear under appropriate treatment.

The prognosis is favorable under proper care.

Treatment consists in rest in bed; it is the most potent agent; baths of the feet, massage, and revulsion by iodine. All operative interference is useless; the disease is indolent and does not require it.

Prophylaxis in the army consists in not permitting men excoriated or fatigued, or those having any general infection, to undertake long marches; the careful supervision of the feet, the shoes, and the fitting of them. Especial care should be taken of the hygiene of the feet.

The Surgical Treatment of Tumors of the Large Intestine.—In operating upon tumors of the large intestine, VAUTRIN (*Rev. de Chir.*, 1897, No. 11) believes the operation of choice to be resection, without fixation of the intestine to the abdominal parietes. The resection of the intestine should be accomplished by the thermo-cautery, while the mesentery should be cut with the scissors, the arteries being caught up by forceps as soon as they are cut. The ligature *en masse* of the mesentery predisposes to subsequent sloughing and interferes with union, especially in the large intestine. The enterorrhaphy should be performed by using two layers of whipped suture, fixed by a backstitch at every centimetre. The first suture is sero-mucous, the second sero-serous. This suture is very rapid and certain, and is preferable to plates or buttons.

The *anus contra-nature* should be reserved for cases of extreme urgency, where acute symptoms demand immediate interference. The resection should be performed secondarily, after the acute symptoms have subsided.

When the tumor is inoperable entero-anastomosis should be performed, wherever it is possible, with exclusion of the involved area. The author would not recommend the employment of the Murphy button in these operations, as the lumen of the button, even the largest size, is too small compared with the calibre of the intestine. He has seen it occluded.

Resection is most commonly employed in resections of the ascending and descending colon, while entero-anastomosis, with exclusion of the affected part, is more common in the transverse colon.

In tumors of small volume the loop of bowel containing the tumor may be drawn outside the abdomen, the intestine fixed in the wound, and the tumor later resected; this is followed by a later operation for the cure of the artificial anus.

The Surgical Treatment of Exophthalmic Goitre.—In discussing the operative treatment of this form of goitre, DOYEN (*Rev. de Chir.*, 1897, No. 11) says that there are but two operations which have the same end in view—the suppression of the secretion of this gland. 1. The thyroidectomy. 2. The section of the cervical sympathetic.

The author has shown a patient in whom, after thyroidectomy, all the symptoms of Basedow's disease were reproduced, except the goitre itself, by the excessive employment of thyroid medication, which he had commenced of his own accord after reading an article on the subject.

In choosing between these operations the choice lies between an operation precise and direct and one that is indirect and probable.

There is no great difference in the danger of the two operations, and the surgeon capable of resecting the sympathetics is equally capable of performing excision, and in an equally short operation. The methods must, then, be judged by the results they produce.

One of the champions of the section of the sympathetics says :

1. Basedow's disease is modified and also cured by this operation.
2. The tachycardia is diminished and disappears after the resection of the sympathetics.
3. The goitre diminishes and disappears, though somewhat more slowly than the exophthalmia.

Thyroidectomy, in four cases in which it has been employed, has produced radical results, not simply ameliorations. And what is better, it suppresses in eight to ten days the tachycardia, over which the section of the surgical sympathetic has no power. That is, it acts immediately upon one of the most grave symptoms of the disease.

The first case operated upon over ten years ago is in perfect health to-day, with no symptoms of relapse, while another is equally well after four years.

Trephining of the Mastoid for Mastoid Disease; No Relief; Subsequent Treatment with Antistreptococcus Serum; Recovery.—PRINGLE (*British Medical Journal*, January 15, 1898) reports the interesting case of a man, aged twenty-two years, who had a temperature of 102.5° F. when admitted to the hospital, and whose temperature remained high, while the only symptoms shown were pain in the occiput, with retraction of the head and pain and stiffness of the erector spinæ muscles. The head was shaved and an ice-bag applied. Potass. bromide, gr. x, every four hours, was ordered. He still complained of great pain, and the temperature rose to 103.2° F.; he objected to the ice-bag. The pupils were regular; the abdomen was not retracted; there was no paralysis, but he did not speak distinctly. There was, sixteen days after admission, a copious discharge of pus from the ear, following a fall in temperature. The patient was still very irritable, semi-delirious, and very noisy. The head was still retracted.

The following day the antrum was trephined and considerable bare bone discovered. The condition remained about the same, with a continued high temperature that denoted the presence of pus, while an optic neuritis, with engorgement of the retinal vessels, was discovered.

The author determined to employ the antistreptococcus serum. Under its influence the patient continued to improve, and was finally discharged. The only signs remaining were a slight thickness of speech and slight paralysis of the right upper eyelid. During his convalescence it was discovered that he had previously had a discharge from the right ear.

The particularly interesting points of the case are: 1. The optic neuritis and its subsequent total disappearance. 2. The treatment by the antistreptococcus serum. Whether improvement was due to the serum is difficult to say, but all improvement took place after its use was commenced.

OPHTHALMOLOGY.

 UNDER THE CHARGE OF

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Trachoma Treated with Applications of Iodine.—E. A. NESNAMOFF (Charkow) has for three years employed solutions of iodine in liquid petroleum preparations or in glycerin in the treatment of various forms of trachoma.

He claims that every form of the disease is curable by its persistent use. Not only are the granules absorbed and pannus cured, but even old scars of the lid are so altered that they no longer injure the cornea. If there is much secretion he uses the glycerin solutions, but for the greater number of cases prefers the petrolatum. The former mixes freely with the secretion; but the latter is more effective if the conjunctival surface has first been wiped with absorbent cotton.

Commencing with the $\frac{1}{2}$ per cent. solution, the strength may be later increased even to 3 or 4 per cent. Applications are made daily, or less frequently, the lids being thoroughly everted and held open for a little time to prevent the iodine from injuring the cornea, or from being quickly neutralized by the secretion.

Iodine is soluble to the extent of about $1\frac{1}{2}$ per cent. in either of the substances mentioned. If a stronger solution is desired it must be obtained by adding sufficient alcohol to the glycerin, or of ether to the petrolatum. Such solutions should be kept in well-stoppered bottles in the dark, and must be frequently renewed to maintain their strength.—*Centralblatt für praktische Augenheilkunde*, vol. xxi., No. 8.

[Many strong astringents and caustics have been demonstrated to possess such positive value in the treatment of trachoma that experiment with a new one is always in order; and the proposed method of applying iodine is distinctly superior to other methods that have been previously tried and found of little value.—ED.]

Membranous Keratitis.—DRANSART (Somain) believes, with Thièbaut, that primary pseudo-membranous keratitis should be recognized as a distinct disease. He reports two cases, one occurring in a man, the other in a woman, and from observation of these, with the two cases reported by Thièbaut, he concludes that the condition may be due entirely to the diphtheria bacillus, to an association of this with the pneumococcus, or that it may be due to a staphylococcus or streptococcus infection. It occurs in an acute form, running its course in three weeks, or in a more chronic form, with irregular acute

exacerbations which may last for years. Vision may be entirely lost by it, but the prognosis is generally rather favorable; three of the four cases retained some useful vision. The treatment recommended includes removal of the false membrane and applications to the denuded corneal surface of aristol or iodoform. An injection of diphtheria antitoxin should be made as soon as possible. Later, iridectomy may be necessary.—*Le Progrès Médical*, 1898, No. 2.

[In this connection, see the cases of chronic membranous conjunctivitis and the comment upon them, page 229 of the February number.—ED.]

Transient Hemianopsia.—W. HARRIS (London), from an extended study of the subject, concludes: That the macular region of the retina is invariably supplied with nerve-fibres on the same plan as the rest of the retina—i. e., each side of it from the corresponding side of the brain, that in cases of absolute transient hemianopsia the dividing line between the seeing and the blind halves invariably passes through the fixation point, but that the cortical centre for the macular region is less liable to complete destruction and recovers earlier than the rest of the half-vision centre. Cases of persistent hemianopsia in which the dividing line passes to one side of the fixation point, leaving it in the seeing half, are to be accounted for either by the escape or partial recovery of the cortical centre for the macula, or by the acquirement by education of a new fixation point in the retina.

The hemianopsia in migraine is due to an epileptic discharge in the half-vision centre of one side. It may originate in or near the half-vision centre on one side, in some cases proceeding no further, beyond producing temporary hemianopsia; in others producing a typical epileptic fit, and again in others giving rise to unilateral convulsions without loss of consciousness. In such attacks it may last twenty-four hours or longer, and may be due to vascular softening adjacent to but not involving the visual centre or path.

Transient hemianopsia is rare in ordinary Jacksonian epilepsy, and is not liable to occur unless the half-vision centre be already slightly damaged, or hypersensitive and prone to spontaneous discharge, as in migraine. It is not infrequently accompanied by unilateral convulsions in general paralysis, and may possibly occur in uræmia.—*Brain*, 1897, Part lxxix.

[The deviation of the line of separation between the blind and the seeing halves of the field around the fixation point is so frequent, and the retained central vision so often perfect, that the supposition of quicker and more complete recovery hardly seems to account for it. Unfortunately, cases of homonymous hemianopsia cannot usually be carefully tested until some time after the lesion has occurred. But the point is worthy of special attention in all recent cases.—ED.]

The Pupils in Multiple Sclerosis and Syphilitic Disease of the Nerve Centres.—B. SACHS (New York) believes that, while the Argyll-Robertson pupil is characteristic of tabes, the complete immobility of the pupils is just as characteristic of a general syphilitic affection. Moreover, this condition of the pupils can be observed in those forms of hemiplegia which are distinctly due to specific endarteritis. Examining such patients, he has often found complete mobility of the pupils in both eyes, whereas in the majority of

other cases of hemiplegia no anomalous action of the pupils can be noticed, except within the first few days after an apoplectic seizure. Of the inequality of the pupils we cannot make much, but a difference in the manner of response of the two pupils—one responding, the other not—is also very common in syphilitic affections. If all other things fail the behavior of the pupils, particularly if there is complete immobility of one or both, would be strong evidence in favor of syphilis rather than of multiple sclerosis.—*Philadelphia Medical Journal*, February 5, 1898.

Entropion Operation.—F. C. HORTZ (Chicago) regards as incorrect the prevalent idea that entropion is caused by shrinkage of the tarsal cartilage and cicatricial contraction of the conjunctiva. He holds such changes are not real etiological factors, because in many eyelids we find extensive cicatricial shrinkage without entropion, while in others we find the lid-margin completely everted, although the tarsus is not contracted, while destruction of the conjunctiva alone, by burn, may cause little entropion.

If closely studied it is found that the anterior edge of the lid-margin, with the lashes, is displaced long before the posterior edge shows the slightest disturbance. He believes the dislocation of the skin and lower bundles of the orbicularis muscle is brought about by the oft-repeated spasms of that muscle. On this account the indication in operation is to draw the dislocated skin and muscle up on the external surface of the tarsus, and fasten it there to prevent its slipping down. This is accomplished by an incision parallel to the lid-margin, the removal of the muscular fibres over the upper border of the tarsus and suturing the skin drawn up from the lid-margin to the upper tarsal border. In some cases he finds it necessary to add an incision in the lid-margin, which, being made to gape, is filled with a graft of skin or mucous membrane, usually of skin cut from behind the ear.—*Journal American Medical Association*, January 15, 1898.

Optic Atrophy Following Sexual Excess.—J. A. SPALDING (Portland, Me.) reports the cases of four young men, sixteen years of age and upward, who suffered atrophy of the optic nerve, going on in each case to practical blindness, with white disk, the temporal portion especially pale, and extensive cupping. There remained fairly good eccentric vision, but central vision was greatly impaired. The family history was good, there was no sign of syphilis and no excessive smoking or drinking. The patients were not blood relations. These patients all died young, one from phthisis, which was not hereditary, another violently insane, the third with obscure nerve-symptoms, the fourth by suicide.—*Transactions of American Ophthalmological Society*, 1897.

Treatment of Trachoma.—NEESE (Kiew) reports that of cases in his public practice 44.6 per cent. were affected with diseases of the conjunctiva, and over 25 per cent. with trachoma. Corneal complications were present in 90 per cent. of the latter, typical pannus in 52 per cent., total blindness of both eyes in 3 per cent. He doubts whether the so-called follicular catarrh differs essentially from true trachoma.

His treatment is medical, mechanical, and operative. Of the former, besides the classical sulphate of copper and the mitigated stick, he employs 1

and 2 per cent. solutions of nitrate of silver, crystallized alum in the milder (so-called follicular) forms, and 2 per cent. solutions of tannin, with good results in convalescence where nitrate of silver even in 1 per cent. solution proves too irritating. Ointments of copper sulphate in glycerin or vaselin were serviceable in cases progressing toward cicatrization.

Jequirity, employed by him as early as 1883, was occasionally quite successful in desperate cases of cicatricial degeneration of the conjunctiva and totally opaque cornea. Resorcin in 6 per cent. aqueous solution was useful in chronic cases with relapsing pannus. Creolin in 1 and 2 per cent. aqueous solution proved a most satisfactory remedy. Under its use the pannus and the granulations disappear. Patients can use it themselves. Corrosive sublimate in solution as a cauterant is valueless; combined with glycerin it is useful in the cicatricial stage with pannus. Powdered tannin alone or in combination with powdered boric acid was quite satisfactory in cases of dense pannus.

Corneal complications, such as recent pannus, infiltration, and ulceration, were treated with the antiseptic bandage and the usual instillations of atropin, eserine, and cocain. In cases of progressive and painful ulcers, where the bandage could not be employed, warm applications of sublimate were very useful.

Of operative procedures division of the external canthus, with or without suture of the conjunctiva (canthoplasty), was found to be of the greatest value in narrowing of the fissure with pressure upon the globe. As regards measures of combating the trachomatous process itself, excision of a portion of the cartilage and of the fold of transition gave very disappointing results. The cases were usually the worse for both of these operations. Expression of the follicles by the fingers alone or forceps, on the whole, gave the most satisfactory results; but medical treatment was also necessary. Massage of the everted lids with cotton dipped in sublimate solution was of decided benefit. Scarifications were useful in acute and subacute stages, especially of papillary trachoma. Peritomy for pannus was practised in 11 per cent. of these cases. It was employed, as a rule, only when the disease of the conjunctiva had reached the stage of cicatrization and a dense vascular pannus remained upon the cornea. The effect is not usually brilliant, but the procedure has its uses. An artificial pupil is of benefit in certain forms of pannus, especially in cases complicated with iritis and irido-choroiditis. Probing of the tear-passages is of the first importance in many cases of trachoma. The most stubborn cases of pannus were sometimes kept up by stricture of the duct. Between 10 and 18 per cent. of his patients were affected with diseases of the lachrymal passages.—*Deutsche med. Wochenschrift*, 1897, No. 43.

Strabismus.—SCHNABEL (Vienna) holds that strabismus is an anomaly of the position of the eyes and not of their motility. Of all possible positions of the two eyes there is one which is determined by the structure of the orbital contents independent of the contraction of any external muscle. If this position of rest is such that the centre of the cornea stands in the centre of the commissure, so that the distance between the two corneal centres equals the distance between the centres of the commissures, it is to be re-

garded as normal, because it presents the most advantageous conditions for binocular vision. Only two varieties of departure from the normal condition can exist, in that the distance between the corneal centres may be greater or less than the distance between the centres of the commissure. In either of these conditions binocular vision is impossible if the external muscles are relaxed. If the departure is not too great the faulty position may be overcome by the contraction of some of the external muscles, and the strabismus becomes latent.

We do not as yet possess any satisfactory anatomical description of the orbital contents of cases affected with strabismus; when this shall have been accurately studied it may be possible to determine exactly upon what particular orbital construction the strabismus depends.—*Wiener klin. Wochenschrift*, 1897, No. 47.

[Sehnabel's reference of the position of the corneal centres to the commissures is unfortunate, since in normal eyes the centre of the cornea is usually much nearer the outer commissure than the inner, and may vary in position independently of any connection with strabismus. His insistence on mechanical factors in strabismus, other than the muscles and their attachments, is timely and important.—ED.]

Colored Vision After Exposure to Excessive Light and After Cataract Extraction.—H. SNELLEN (Utrecht) points out that Fuch's explanation that colored vision is dependent upon changes in the visual purple is inadequate. He suggests that in strong illumination much light enters the eyeball through the lids, sclera, and choroid, affecting chiefly the periphery of the field of vision, and that this light has a decidedly red tinge. The objects directly looked at, however, are seen by white light. When the strong light is shut off, as at night, or in the comparative darkness of a room, the exhaustion of the periphery of the retina for red causes a green after-tint, in contrast with which objects looked at in the centre of the field appear red. This explanation is supported by the experiment of looking through red gelatin with a hole in the centre. Through this centre objects first appear of normal color, but afterward seem green by contrast. If, then, the color be removed the colors appear to be reversed and the phenomena of red vision, or erythropsia, occur.—*Graefe's Archiv für Oph.*, vol. xlv., Part ii.

S. M. BURNETT (Washington) calls attention to the glaring white haze complained of immediately after cataract extraction, which he regards as a temporary loss of ability to perceive colors, such as the normal eye may experience when suddenly exposed to a flood of white light.

He also calls attention to kyanopsia (blue vision), a term only represented in two medical dictionaries, and by the erroneous spelling "eyanopia." This blue appearance of objects is very frequent after cataract extraction. He believes it to be due to the contrast with the yellowish light, which previously reached the retina through the opaque lens. He has noticed it only in cases in which the nucleus was distinctly yellow or brown; and he points out that it is more persistent where the patients still retain a cataract of similar color in the other eye, with which to contrast the impressions made upon the eye from which the cataract has been removed.—*Ophthal. Record*, 1898, p. 17.

OBSTETRICS.

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The High Application of Forceps in Cases of Contracted Pelvis.—In the *Archiv für Gynäkologie*, Band lv., Heft 1, 1898, TóTH contributes an extensive paper upon this subject, narrating the experiences of the staff of the Obstetric Clinic at Budapest.

His cases number forty-four, and he reaches the following conclusions from his studies:

The high application of the forceps is not an especially dangerous procedure for mother or child. When the head presents it is much to be preferred to podalic version. The high application of forceps should always be tried before resorting to craniotomy in cases where version is not indicated. In pelvises which are not highly contracted the forceps is to be preferred to version, because an effort to deliver with forceps does not prevent the physician from awaiting a spontaneous issue of the birth. The same thing is true in cases where the child is excessively large. Where, however, the high forceps does not succeed, craniotomy must be performed. If all the conditions are favorable, symphysiotomy may be tried. For this use of forceps, a long, well-made instrument is necessary, and of these Tarnier's has been found the best.

Influence of Morphine and Ether upon Labor Pains—HENSEN (*Archiv für Gynäkologie*, 1898, Band lv., Heft 1) has conducted a series of experiments to ascertain the effect of morphine and of ether upon uterine contractions. In ordinary doses morphine is without influence on contractions of the uterus and abdominal muscles. Ether greatly lessens the force of uterine contractions so soon as one-half minute after inhalation begins. The effect of ether disappears in from five to twenty minutes. The contractions of the abdominal muscles cease during anesthesia under ether. As regards the difference between ether and chloroform the immediate effect of each is practically the same, but the patient recovers her power of uterine contraction far sooner after the use of ether than after the employment of chloroform.

Cæsarean Section with Transverse Incision of the Fundus for Carcinoma.—In the *Centralblatt für Gynäkologie*, 1898, No. 10, CLEMENZ reports the case of a patient, a multipara, who complained of pelvic pain, backache, emaciation, difficult micturition, and pain in the abdomen. She had also lost blood through the vagina. Examination revealed the patient in a prog-

nant condition, the fœtus viable, while the vagina and cervix were extensively infiltrated with carcinoma.

When labor pains came on partial dilatation occurred, the patient was anæsthetized, the cervix thoroughly curetted, and applications made of tincture of iodine. She was then transferred to the operating-room and the abdomen opened by other physicians than those who curetted the cervix. A transverse incision was made across the fundus, and the child easily and quickly extracted. The placenta was readily removed from the anterior wall of the uterus. A strand of iodoform gauze was passed through the cervix for drainage, and the uterus closed in the usual manner. The patient made a good recovery from the operation, but the carcinoma increased to some extent. She was transferred to a general hospital and became well enough to go to her home.

Cæsarean Section with Transverse Incision of the Fundus.—In the *Wiener klinische Wochenschrift*, 1897, No. 52, HAIN reports the following case:

The patient was a primipara, aged thirty years, who had been in labor thirty-six hours. She had a justo-minor pelvis, with true conjugate less than three inches. The abdomen was opened, an elastic ligature placed about the cervix, and the uterus opened by a transverse incision across the fundus. The child and placenta were readily removed. Seven silk stitches closed the deeper tissues in the uterus, and the superficial parts were readily brought together. There was considerable hemorrhage, which was controlled by the injection of ergot. The patient made a good recovery.

Laceration of the Rectum Above the Sphincter in Normal Labor.—GMEINER (*Centralblatt für Gynäkologie*, 1898, No. 10) reports the case of a primipara, aged twenty-one years, who had a spontaneous delivery. The fœtus was in the usual position, and, as delay occurred in labor, the patient was given a warm bath. Membranes ruptured spontaneously, and soon after it was found that with every pain amniotic liquid was escaping through the rectum. To prevent further laceration episiotomy was performed. After the delivery of the child and its appendages an examination showed three small apertures in the anterior wall of the rectum. These were closed with catgut, the pelvic floor was repaired, and the perineum closed. The patient made an excellent recovery.

Extra-uterine Pregnancy and Abdominal Section, with the Recovery of Mother and Child.—In the *Centralblatt für Gynäkologie*, 1898, No. 13, JURINKA reports the following interesting case: The patient came to the clinic in Graz, complaining of swelling and pain in the abdomen. She had borne two children by normal labors, and thought herself five months pregnant. A tumor was found at the entrance to the pelvis, which could be outlined as a fœtus and its sac, as the patient's abdominal wall was very thin. Fœtal heart-sounds could be faintly heard. An internal examination enabled the observer to pass the finger into the uterus, which was empty and considerably enlarged. A diagnosis of extra-uterine pregnancy with the fœtal sac behind the uterus was made.

On opening the abdomen the tumor lay upon the left side, extending be-

hind the uterus. The sac was adherent to the mesentery and intestines. When an effort was made to separate these adhesions the fetal sac ruptured, and the child was at once delivered and its cord tied. It was impossible to make a pedicle for the sac, as its adhesions were too extensive. The placenta was near the cornu of the uterus, and an effort to remove it was accompanied by free hemorrhage. The sac was removed as far as possible, and the Fallopian tube on the left side ligated. The peritoneal cavity was carefully cleansed, a gauze packing was inserted and brought out at the lower end of the abdominal incision. The child was at first asphyxiated, but revived.

The recovery of the mother was complicated by bronchitis from which she suffered. The gauze was gradually removed without difficulty. No discharge of decidua from the uterus could be detected.

The patient was kept in the hospital for some time, and when discharged a small fistula existed at the lower end of the abdominal scar and leading into the pelvis. The child was artificially fed and developed some of the nervous symptoms referred to an abnormal condition of the brain. There was no reason to think that birth-pressure caused the nervous complications.

The Secretion of Urine by the Fœtus.—SCHALLER (*Centralblatt für Gynäkologie*, 1898, No. 13) has made experiments with phloridzin to determine the question of the secretion of urine by the fœtus. This chemical detects sugar in the urine with great accuracy, and upon this action were based these experiments. It is generally believed that the secretion of the fetal kidneys is discharged into the amniotic liquid; hence, if this liquid be examined for sugar, its presence would indicate that the secretion of urine had been going on.

The results of his experiments were as follows: In the early part of pregnancy, the fourth and sixth months, no sugar was found in the amniotic liquid. A short time before the beginning of labor, out of twenty cases, six showed some sugar. None, however, was found until labor-pains had actually begun. If this substance was given to the mother by the mouth, eight hours after the last dose was taken her urine showed no signs of sugar. If the mother came into labor during this time, the urine of the newborn child gave a reaction for sugar for thirty-two hours after the mother's last dose. The first urine passed by the newborn infant had a smaller amount of sugar than the second or third quantities. Experiments upon animals were made by injecting phloridzin hypodermatically. This caused the discharge of from 4 to 7 per cent. of sugar in the urine. These animals, which were pregnant, were subjected to abdominal section and the amniotic liquid was aspirated from the uterus. In none of these cases was sugar found in the amniotic liquid.

Pregnancy and Labor in Cases in which Amputation of the Cervix has been Performed.—In the *Annales de Gynécologie*, 1898, vol. xlix., AUDERNERT reviews the histories of sixteen cases in which amputation of the cervix had been performed previously. He finds that the condition which remains after this operation influences pregnancy and labor in a very marked way.

These sixteen patients had twenty-two pregnancies, and but five of these

went to full term. As to the length of labor, it was often prolonged by premature rupture of the membranes. Labor varied from twelve to twenty hours in length. A considerable number of abnormal presentations were also noticed in these cases, among them three shoulder presentations. The foetal mortality was 5 per cent. Interference was necessary more often than usual, to secure complete termination of labor.

In caring for these patients during pregnancy every precaution must be taken not to excite uterine contractions and bring about premature rupture of the membranes. When labor has actually begun, dilatation may be shortened by using elastic bags, or by the hand, or by making multiple incisions if necessary.

Symphysiotomy.—FIEUX, in the *Annales de Gynécologie*, 1898, vol. xlix., reports the case of a patient in her fourth pregnancy who had a normal pelvis. Her previous labors had been attended with no especial difficulty. In her fourth, however, the large size of the child and the firmness of its head prevented engagement and the usual progress of labor. Symphysiotomy was accordingly performed and a large male child delivered. Mother and infant made a good recovery without complications.

In the *Annales de Gynécologie*, 1898, vol. xlix. p. 177, LEPAGE reports eight symphysiotomies for contracted pelves.

The first was a woman, aged nineteen years, who was slow in walking as a child, and had sustained a fracture of the right thigh. Her pelvis was very irregular in outline, the external conjugate being 9 cm. Symphysiotomy was performed, and the child delivered with forceps. It breathed, but did not live. An autopsy showed intense congestion of the cranial contents. The mother made a good recovery.

The second case was a multipara, aged twenty-seven years, who had lost two children by difficult version and slow extraction. The pelvis was irregularly shaped, and the promontory of the sacrum hard to reach. Symphysiotomy was performed and the child successfully delivered. The mother was threatened with phlebitis for several days, but escaped serious complications.

The third case was a multipara who had borne eight children. Some of them had been lost in birth, while others had survived. Her pelvis was atypical in shape, and the head of the foetus presented without flexion, a parietal bone being at the brim of the pelvis. After symphysiotomy the child was delivered with the occiput behind. The placenta was decomposed and the membranes macerated. Mother and child made a good recovery.

In the fourth case an unsuccessful effort had been made to apply forceps before the patient was brought into the hospital. After symphysiotomy a living child was delivered by forceps. The mother suffered from incontinence of urine and swelling of the left thigh and knee. She made, however, a tedious recovery.

The fifth case was that of a patient with a rhachitic pelvis, the external conjugate being 10 cm. After symphysiotomy the child was delivered asphyxiated, but revived. The patient had intestinal disturbance during her recovery, with fever, headache, and pain in the left thigh. Her child did well.

In the sixth case the child was injured by pressure before delivery. The mother was a primipara, aged forty years, and labor was hindered by prolapse of the arm. The child died some hours after delivery from meningeal hemorrhage. The mother made a good recovery.

In the seventh case the pelvis was normal, but the child excessive in size, and symphysiotomy was performed in the interest of the child. After the symphysis was opened the child was expelled spontaneously in twenty minutes. Its head was severely bruised by the projecting sacrum of the mother. The mother recovered with some complications occasioned by pain in the thigh and hip-joints.

The last case reported was that of a multipara who had borne a child by symphysiotomy. She had a convex sacrum which prevented the descent of the head. On examination the scar of the first operation and the points where sutures had been inserted could be detected. It was difficult to open the joint because of the large amount of cicatricial tissue there present. The child was expelled spontaneously and speedily revived. The mother made a good recovery.

GYNECOLOGY.

UNDER THE CHARGE OF

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Perforation of the Uterine Wall During Curettage.—JAHREISS (*Centralblatt für Gynäkologie*, 1898, No. 6) reports two cases in which, during careful curettage after abortion, without previous dilatation, the instrument suddenly penetrated the uterine cavity as far as the handle. In one instance the end of the curette could be felt within a dilated tube; in the other the entire absence of any reaction led the operator to infer that the same accident had occurred. In a third case, in which he did perforate the uterine wall, peritonitis developed, and he performed oöliotomy successfully on the fourth day. He admits that it is not easy to demonstrate the fact that the end of the curette has merely entered a dilated tube.

GLAESSER (*Ibid.*), reports the case of a woman who had been confined three months before, and suffered from menorrhagia, to relieve which it was proposed to curette the uterine cavity. A sound was gently introduced, and without the slightest sense of resistance it slipped through the cervix as far as the handle. It was reintroduced several times, and the same phenomenon was noted, so that it was supposed to have entered a dilated tube. As there was profuse hemorrhage, however, the writer feared that he had perforated the uterine wall, and promptly performed vaginal hysterectomy. On examining the uterus four openings were found at the fundus. The wall was so soft that it was possible to pass the sound and even the finger through it without the least effort. The danger of curetting such uteri is evident.

Palpation of the Uterine Cavity.—SAENGER (*Centralblatt für Gynäkologie*, 1898, No. 7) pleads for the importance of preliminary examination, dilatation, and palpation of the uterine cavity before undertaking surgical procedures. This applies to all cases of hemorrhage, whether due to abortion or to neoplasms. He uses laminaria tents, and finds it necessary to enter into quite an elaborate defence of them.

[It is to be regretted that this means of arriving at an exact diagnosis of intra-uterine conditions has fallen into disuse in this country. Doubtless many radical operations would be avoided if the finger, instead of the curette, were more frequently employed as a diagnostic instrument.—H. C. C.]

Aseites in Young Girls.—BOUILLY (*Abeille Méd.*, 1897, No. 26) describes the form of disease which Cruveilhier originally termed the idiopathic ascites of young girls. It usually occurs in virgins or multiparæ, from thirteen to twenty-four years, and is unaccompanied by pain. The patients are pale, usually emaciated, and amenorrhœa is nearly always present. The ordinary physical signs of aseites are often absent, the abdomen being rounded as in ovarian cyst. An important point in the differential diagnosis is the fact that in ascites the fluid is often found at different levels on successive examinations.

Palpation is generally painless. The diagnosis is aided by the finding of enlargement and thickening of the adnexa.

In most cases surgical interference is necessary, though in two instances the writer observed the spontaneous disappearance of the fluid.

Pregnancy after Transplantation of the Ovary.—KNAUER (*Centralblatt für Gynäkologie*, 1898, No. 8), continuing his experiments with rabbits, reports a successful result. He demonstrated the following facts: 1. That in rabbits the ovaries may be transplanted from their normal sites. 2. That they may be grafted on the peritoneum and imbedded within muscle, and still preserve their functions.

In the case reported both ovaries were extirpated and were sutured within the posterior fold of the broad ligament on either side, in such a way that a portion of the outer surface of the ovary projected into the peritoneal cavity. Thirteen months later the abdomen was reopened and the cornua uteri were found to present the appearance observed in normal pregnancy. The ovary implanted in the right broad ligament was of normal size, and on its surface were three ripe follicles. The left ovary was also normal in appearance, but contained no follicles. An intestinal adhesion was separated and the cavity was closed. Three months later the rabbit was delivered of two well-developed animals.

The writer calls attention to the fact that this is not only the first successful case of delivery at full term after experimental transplantation of the ovaries, but that sixteen months elapsed between the operation and parturition.

Injuries due to Bicycling.—VON KEERSMAECKER (*Ann. de Soc. de Méd. d'Anvers; Frauenarzt*, February 18, 1898) has observed cases in which purulent inflammation resulted from bicycling, in women with irritable urethræ

or in those who had had previous inflammation of the canal. He would therefore advise against this form of exercise in all cases of chronic affections of the urinary tract. Saddles with sharp pommels are especially harmful.

ALDHUY (*Gaz. hebdom. ; Frauenarzt*, February 18, 1898) reports cases of erythema, hæmatoma, abscesses and anæsthesia of the perineal region, polyuria, and urethritis, but believes that the benefits outweigh the evil results of bicycling.

Intra-pelvic Displacement of the Appendix.—BARUSHY (*Presse Médicale ; Frauenarzt*, February 18, 1898), from an examination of 121 subjects of all ages, notes the following results: In the fœtus and newborn the deep position of the appendix was noticed in only three cases, while in twelve old women it was found eight times. Out of one hundred young subjects, in sixty-one the tip of the appendix was found as low as the brim of the pelvis; in thirty-two of these the appendix actually occupied the pelvic cavity, being in close relation with the rectum, bladder, uterus, or posterior surface of the broad ligament.

Influence of Menstruation on Chronic Psychoses.—NÄCKE (*Archiv für Psychiatric ; Frauenarzt*, February 18, 1898) analyzed 99 cases, with the purpose of recording the influence of menstruation upon insanity; these included 57 cases of paranoia, 23 of hallucinations, 12 of mania or melancholia, and 7 of idiocy. In 73 cases the patients were observed during from eight to fifteen periods, in all during not less than four. In 65 the influence of menstruation was *nil*, doubtful in 16, and certain in only 16. The results ordinarily observed were increased vasomotor pressure, restlessness, increase of hallucinations and rarely erotic impulses.

The writer infers that in general menstruation in the chronically insane differs but little from the function in healthy women, and its influence on the course of the malady is slight and inconstant.

Metrorrhagia due to Liver Disease.—DALCHI (*Frauenarzt*, February 18, 1898) affirms that the relation between hepatic affections and metrorrhagia is undoubted. It is most marked in cholelithiasis. The flow becomes more profuse after the attacks of colic, and may reappear after the normal period, lasting several days. After repeated colicky seizures the menstruation becomes irregular, and may cease. If the patient has uterine disease hemorrhage occurs between the periods. Metrorrhagia is common in the early stages of cirrhosis; later, amenorrhœa is present. Hepatic tumors and icterus of septic origin may also be attended with uterine hemorrhage.

Rupture of the Vagina during Coitus.—WARMAN (*Centralblatt für Gynäkologie*, 1897, No. 24) considers this accident from a medico-legal stand-point. He shows that, contrary to the usual view, it is less apt to occur during rape, even in children or in women with small, rigid vaginæ, than in cases of violent coitus in which the female herself is under the influence of strong sexual excitement. In twenty-six cases analyzed by the writer there were only three in which rape was charged, and even these were doubtful. In

most instances the vagina was capacious and the tissues presented no abnormality; in fact, it was impossible to discover from an examination of the parts any cause for the lesion. Unusual size of the penis did not appear to be a factor, nor did the position assumed during the act.

The explanation of the frequency of rupture during impetuous, voluntary intercourse, as compared with its rare occurrence in rape, seemed to be that in the former case the vagina was projected violently toward the penetrating organ, while in the latter it was drawn away by the muscular efforts of the victim.

Malignant Fibro-cyst of the Uterus.—VITRAG (*Annales de Gynécologie et d'Obstétrique*, January, 1898) concludes a paper on non-epithelial malignant tumors of the uterus as follows: Certain neoplasms which originate in the connective or muscular tissue of the uterus, usually described as sarcomata, are really fibromata or myomata. By reason of their embryonic character these are, however, to be regarded as malignant. The neoplastic elements develop around the vessels and in their walls, in the connective tissue, hence the tumors are to be regarded as fibromata.

As these growths are prone to cystic degeneration, the writer suggests for them the name "malignant polycystic fibroma."

Carcinomatous and Sarcomatous Degeneration of a Uterine Fibroma.—IVANOFF (*Wratch*, 1897, No. 50) describes a rare form of degeneration of an adeno-fibroma in a woman, aged forty-seven years, who succumbed to operation. The tumor consisted of two portions, one on the posterior surface of the uterus which presented the ordinary microscopical appearances of spindle-celled sarcoma, and another which projected into the vagina and showed the structure of a typical adeno-carcinoma. The growth also contained connective and smooth muscle fibres, glands, and cavities lined with cylindrical epithelium. The writer infers that the neoplasm was originally an adeno-fibroma in the posterior uterine wall. In consequence of some unknown irritation sarcomatous and adenomatous degeneration occurred simultaneously, the original fibroma being transformed into an adeno-sarcoma, while the adenomatous portion penetrated the posterior vaginal wall and subsequently became the seat of carcinomatous degeneration.

Histology of the Prolapsed Uterus.—ALEXIEFF (*Inaugural Thesis*; abstract in *La Gynécologie*, February 15, 1898), after careful microscopical studies of the vaginal portion of the uterus in ten cases of complete prolapsus, states his conclusions as follows: The mucous membrane of the cervix is usually cornified, and erosions and even true ulcerations are common. The glands of the cervical canal are increased in number and size, and become sacculated. The veins and lymphatics of the portio are dilated, and chronic endarteritis is present, which sometimes results in complete occlusion of the lumen. The muscular bundles in the portio are scanty, while the interstitial connective tissue is greatly hypertrophied. Infiltrations of round cells are observed, especially in the neighborhood of the vessels and glands. There is no change in the number or appearance of the elastic fibres.

PÆDIATRICS.

UNDER THE CHARGE OF

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A Case of Pemphigus Neonatorum.—HOLT (*New York Medical Journal*, February 5, 1898) reports an interesting case of so-called pemphigus of the newborn, which bears out the findings of Strelitz and others, and shows that certain of these cases are simply varieties of sepsis, and are not due to syphilis, to which all such cases have been most generally attributed.

The infant when admitted to the hospital, at the age of nine days, presented many bullæ over its shoulders and lower part of its body. No history of syphilis was obtained in the parents or in two other children. It was brought from a home of great destitution and squalor, and had evidently been neglected from its birth; but in spite of this it was vigorous and well nourished. The body was very dirty. The bullæ were from a quarter of an inch to an inch in diameter; none were present over the back or chest, none upon the feet or hands, and only two upon the face. Some of the more recent lesions were flaccid, and had slightly turbid contents; others had ruptured, showing a deep red base formed by the cutis vera, and still others showed superficial ulceration, and were discharging pus. The navel was normal, but a moderately severe purulent ophthalmia existed, which showed abundant pus organisms, but no gonococci. The contents of one of the bullæ on the neck and of another on the thigh showed pure cultures of the staphylococcus pyogenes aureus.

The condition grew worse; numerous new lesions appeared, and the baby died of exhaustion on the third day after admission.

The lungs showed large areas of atelectasis in both lower lobes, with emphysema anteriorly and many punctate hemorrhages on the surfaces of both lower lobes. The thymus showed punctate hemorrhages, and the liver, spleen, kidneys, and suprarenals were intensely congested, the latter showing also punctate hemorrhages. Cultures from the lungs showed the staphylococcus with the bacterium lactis aerogenes; the spleen and left kidney, the streptococcus longus; and the liver, the streptococcus longus and the staphylococcus. Cultures of the staphylococcus were injected into a mouse, which was found dead at the end of twenty-four hours, yielding the same organism from the heart's blood and at the site of injection.

Acute Nephritis Complicating Mumps.—CHARLES G. KERLEY (*Archives of Pediatrics*, February, 1898) records a case of mumps of moderate severity in a boy of four years. The child was seen for the first time on the third day of the disease, and rest in bed was enjoined. Five days later it was found that the child had been allowed to be up and about the house. His

condition was markedly changed. The skin was pale and waxy in appearance, with œdema of the lower lids and adjacent parts, but none elsewhere. Temperature was 103° ; the pulse hard and wiry, beating 140, and the skin was hot and dry. No urine had been passed during the previous twenty-four hours, and for two days before the suppression the urine had been high colored and scanty. After appropriate treatment a small quantity of urine passed was deep-red in color and was loaded with albumin, the microscope showing blood in abundance, with granular and hyaline casts. Recovery was very rapid and complete, normal urine being passed on the sixth day of the attack.

The author directs attention to the value of hot saline flushing of the colon in the management of cases of this type, having found this a most efficient means of inducing the kidneys to resume functional activity.

[This very rare instance of renal disease complicating mumps emphasizes the fact that even in the mildest infectious diseases, as has been so recently proven concerning varicella, the condition of the kidneys should always be watched during the course of the disease and in its convalescence.]

The Pseudo-membranous Anginas of Scarlatina.—HIRSCHFELD (*Jahrbuch f. Kinderheilkunde*, Bd. xlv., S. 237) presents a valuable study of 166 cases of scarlatinal angina observed in the service of Professor Heubner. Three groupings were distinguished.

The first group comprised fifty cases, in which the angina was slight, and appeared under the form of isolated or confluent plaques upon the tonsils, and sometimes invading the uvula and pharynx. The false membrane was distinguishable in these cases from that of diphtheria by its viscid consistence and its feeble adherence to the subjacent tissues. The submaxillary ganglia were frequently swollen, and at times reached the dimensions of a nut, but often tumefaction was absent. This angina exercised almost no influence upon the general state and the morbid phenomena belonging to scarlatina. Appearing ordinarily from the first to the third day, it was over in from ten to fifteen days. The treatment was purely symptomatic and not local. All these children recovered.

In the second group, which comprised the cases designated by the author as the malignant form of scarlatinal angina, the prognosis was extremely grave. Of twenty-seven children presenting this form of the complication, not one recovered. These cases were among children varying in age from nine months to three years, most of whom were exhausted by a previous infectious disease (diphtheria, measles, pertussis, rhachitis, syphilis, etc.). The angina was present at the onset, or appeared from one to four days after the beginning of the disease. The false membranes extended rapidly, the breath became fetid, and sanious fluid came from the nostrils. The swelling of the ganglia was enormous, and reached the clavicles, having the appearance of a diffuse phlegmon of the neck, but yielding no pus upon incision. Other manifestations of septicæmia were suppurative otitis, purulent conjunctivitis often with panophthalmitis, suppurative arthritis, broncho-pneumonia, hemorrhagic nephritis, and catarrhal or pseudo-membranous enteritis. The heart and liver showed parenchymatous degeneration, with hypertrophy of the spleen. Treatment seemed without avail.

In the third group of eighty-nine cases, the pseudo-membranous angina was more chronic in its course. It began as a pseudo-membranous angina or as a catarrhal angina, later becoming membranous, the main disease following its regular course. At the end of the first week the fever recurred, and otitis, synovitis, or erysipelas might be found, but more frequently a new swelling of the submaxillary glands developed. With this the throat, which was usually clean, became affected again within twenty-four or forty-eight hours, and symptoms of the malignant form developed, to which the child sometimes succumbed.

In all these groups the angina is due to the scarlatinal poison, and is aggravated in the last two groups by a secondary streptococcal infection. For local treatment the author advises interstitial injections of a solution of carbolic acid of 3 or 5 per cent. strength, half a Pravaz syringeful of the solution being injected twice daily into each tonsil. This treatment, which seemed of no benefit in the acute malignant cases, was, however, successful in fifty-six out of the sixty cases of the chronic form. In no case were symptoms of carbolic-acid poisoning produced by these injections.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Syringomyelia.—SAXER (*Centralblatt für Allgemeine Pathologie u. Pathologische Anatomie*, 1898, Bd. ix. p. 6) says that in 1892 E. Cramer summarized in the *Centralblatt für Allgemeine Pathologie* those works which had appeared during the year 1891 on the subject of syringomyelia. The conclusions reached by him in regard to the views held at that time on the subject of syringomyelia were as follows: 1. The etiology of syringomyelia is not yet settled. In certain cases anomalies of development and injury seem to play a certain rôle. 2. The symptom-complex of syringomyelia can be produced by various lesions, but in most cases the lesion is a simple chronic growth of neuroglia tissue. 3. The lesion is generally localized in the gray matter behind the central canal of the cord. 4. Morvan's disease is clinically and pathologically only a form of syringomyelia. In Morvan's disease the peripheral nerves may also be diseased. 5. The disease may last two or three years (glioma) to thirty or forty years (simple growth of neuroglia tissue). 6. The cavity arises by the breaking down of pathological tissue (usually simple growth of neuroglia tissue). 7. The connection of the central canal with the cavity is secondary. In like manner Saxer reviews 146 articles which have appeared on this subject since 1892. He discusses first *hydromyelia*, in the classical cases a tube-like dilatation of the spinal canal, lined with characteristic epithelium. Variations of this form, however, occur; the epithe-

lium may be wanting over large areas, the central canal may be double, the cavity may be more or less separated from the central canal in places, or the neuroglia tissue around the central canal may be increased. Leyden has drawn the conclusion from such cases that most syringomyelias are hydromyelias dependent on congenital anomalies. Saxer then takes up *syringomyelia*, under which term is understood an elongated cavity in the cord, which is either entirely independent of the normal central canal or is only connected with it accidentally. The pathogenesis of these cavities is various. In the opinion of most writers they arise most frequently in consequence of the breaking down of a primary growth of neuroglia tissue. To this new formation of neuroglia tissue the terms *gliosis*, *gliomatosis*, and *glioma* have been applied. K. MIURA insists on a sharp distinction being made between true malignant glioma and other forms of neuroglia tissue-growth to which the term gliosis should be applied. The indefinite term "gliomatosis" should be replaced by "diffuse glioma" when it refers to an infiltrating glioma, otherwise by "gliosis." Most authors are of the opinion that in syringomyelia the growth of neuroglia tissue is primary, and the cavity secondary through the breaking down of the newly formed tissue. This view is strongly opposed both by Hoffmann and by Schlesinger in their extensive monographs on this subject. They believe that the starting point of these changes is to be found in congenital anomalies of the central canal combined with hydromyelia. This view is not entirely new, but it is now advanced with the support of the latest discoveries in the histogenesis and histology of the central nervous system, particularly the latest results in regard to the development of the ependyma and the neuroglia. In order to make the line of argument clear, Saxer summarizes, for the sake of the uninitiated, the discoveries of the last few years in regard to the neuroglia.

According to Hoffmann, the starting point of the disease is to be found in the majority of cases in congenital anomalies of development, as shown by groups of embryonic cells which remain behind the normal central canal along the line of closure of the neural canal. Multiplication of the central canal has a similar significance. From these embryonic remains there arises a growth of neuroglia tissue in which a cavity is usually produced by the breaking down of this newly formed tissue. Hoffmann classifies the cavities of the cord as follows:

1. Hydromyelia.
2. (a) Primary (central) gliosis of the cord, with or without hydromyelia.
 1. Without cavity formation.
 2. With cleft and cavity formation.
- (b) Central gliosis with or without cleft formation, with indefinite symptoms.

The opinion of Hoffmann and Schlesinger, that syringomyelia is connected with congenital anomalies of the cord, previously had many advocates, and their views may now almost be regarded as a settled dogma. Gerlach has tried to prove that the cavity in syringomyelia is lined by connective tissue derived from the pia; but his conclusions are not generally accepted. Certain cases of tube-like cavities in the cord without gliosis have been reported by Schlesinger, Weigert, and others. Weigert claims that the consideration of syringomyelia as softening of a central gliosis has not the shadow of

probability in favor of it. He calls attention to the fact that in multiple sclerosis, for instance, no breaking down and cavity formation ever take place. Hoffmann would limit the term syringomyelia strictly to cases of central gliosis, and would exclude all cases of cavity in the cord due to hemorrhage, suppuration, softening due to pressure, etc., in spite of the fact that all of the cases may show the same symptom complex.

At the end of his summary Saxer considers the connection between the syringomyelia and trauma, chronic meningitis, Morvan's disease, tabes dorsalis, and leprosy. Saxer, unfortunately, fails to summarize what he considers to be the advances made in the knowledge of syringomyelia since Cramer's review in 1892. They may, perhaps, be summed up as follows: 1. There is a tendency to separate the various forms of cavity formation in the cord as sharply as possible on an etiological basis. 2. Hoffmann would limit the term syringomyelia to cases of central gliosis. 3. The connection between most cases of syringomyelia and anomalies of development of the central canal of the cord is now generally accepted. 4. The terms *glioma* (a malignant new growth) and *gliosis* (a pathological growth of neuroglia tissue which shows none of the properties of a new growth) are clearly differentiated. The indefinite term *gliomatosis* should be given up. 5. According to Weigert the cavity in syringomyelia is primary and never due to the breaking down of a central gliosis.

Phagocytosis in Relapsing Fever.—Relapsing fever has long been considered to afford conditions most favorable for the study of phagocytosis, both because of the presence of the specific micro-organisms in the blood in large numbers, and because of the leucocytosis incident to the febrile paroxysm. These facts were early adduced by the advocates of the doctrines of phagocytosis as explaining the almost uniformly favorable outcome of the disease. Owing to the comparative rarity of relapsing fever, however, but little opportunity has been afforded for the study of these questions.

Metschnikoff, about ten years ago, after repeated failures to detect phagocytosis in the circulating blood, nevertheless found evidence of it in the spleen, and it was supposed that the germs were there overcome by the protective agencies of the body, Metschnikoff suggesting that the rapid motion of the blood in the general circulation was unfavorable to phagocytosis. To the spleen was then attributed great importance in overcoming the disease. Doubt has, however, been cast upon this theory by Tietiu (1893), who found that inoculated monkeys recovered from the disease as well without the spleen as with it.

It is now found by IVANOFF (*Centralblatt für Bakteriologie u. Parasitenkunde*, 1897, xxii. 117) that phagocytosis does occur in the circulating blood in relapsing fever. In examining the blood of a patient shortly before death, Ivanoff discovered fragments of spirilla in many of the leucocytes as well as large numbers of more perfect spirilla in the plasma. The intracellular spirilla stained but feebly, and were apparently in process of disintegration.

Subsequent examination of the blood of a large number of patients suffering from relapsing fever showed similar appearances in all, and the same was true of the blood of a large number of artificially immunized monkeys.

Indeed, in these last the spirilla could be detected only in the corpuscles; none were found in the plasma, and the inference drawn by Ivanoff is that the immunity in these cases is due to heightened phagocytosis.

As before mentioned, the intracellular spirilla stain very feebly and may, consequently, be readily overlooked. For their detection a rather special method of staining is recommended: After thorough fixation on a cover by baking for an hour or more at 110° to 120° C. the specimen is immersed for from one to three minutes, with gentle warming, in a staining solution consisting of 20 to 25 c.c. of Roux's stain,¹ to which 2 to 4 c.c. of Ziehl's carbolic fuchsin have been added. The preparation is then washed in water, dried, and mounted in balsam.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

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A New Experiment in the Treatment of Town Sewage.—The pollution of rivers with sewage and of wells with the ooze from cesspits in which the excreta are deposited at a depth at which nitrifying bacteria are no longer found has, with increasing density of population, reached a pitch on both sides of the Atlantic which cries for redress, and must no longer be tolerated. The remedy for the rural evil is simple enough: the suppression of the common privy and the substitution of earth closets or dry catches, with the immediate application of all excreta to the garden plot in the case of cottages, and in that of large establishments the collection of all excreta, water-closet, and domestic slops in perfectly impervious cemented tanks, with pumps and arrangements for the regular disposal of the liquid by hose or irrigation over garden, orchard, or meadow.

Town sewage must ultimately return to the rivers whence it was drawn, or toward which it was wending when impounded or pumped for the public water-supply; but the great problem of the day is how to purify it so far as not sensibly to pollute the stream. Chemical processes stand *de facto* condemned as unscientific and opposed to the elementary principles of economics. Even if the chemicals added are not such as to render the effluent hurtful to animal and vegetable life, unfit, therefore, for discharge into rivers or distribution over the land, they act by destroying the microbes whose function it is to transmute offensive organic matter into purely inorganic salts, to mineralize it as the process has been called, and so to render it capa-

¹ Roux's stain is prepared by mixing 15 c.c. of a 1 per cent. aqueous solution of dahlia, 45 c.c. of a 1 per cent. aqueous solution of methylene green, and 10 drops of formalin.

ble of affording food for plants. The putrescent matter is not destroyed; the antiseptics preserve it in a *putrescible* state, ready to undergo putrefaction so soon as by dilution the percentage has fallen below a certain point.

It is true that in intermittent irrigation over cultivated land advantage is taken of bacterial action, but of one kind only, viz., that of nitrification, and a relatively wide area of soil naturally or artificially fitted for the purpose is indispensable, the less suitable the earth the greater being the area required; certain contours are necessary, and some soils are wholly impracticable. When, however, a large volume of liquid sewage is received in a closed tank the changes it undergoes are of a totally different character. The air being practically excluded, nitrification cannot take place, since the bacteria engaged in this process, which consists in the oxidation of the nitrogen of the albumin, gelatin, and ammonia compounds, are necessarily *aërobic*. Instead of this, *anaërobes* are developed which exert a peptonizing action on the nitrogenous organic matters, which may conveniently be designated as albuminoids, converting them into peptones, and thus transforming the insoluble organic matters into soluble equivalents. A scum some inches thick forms on the surface, but does not perceptibly increase, for as fast as fresh matter is added above, the lower portion passes into solution, mineral matters sinking to the bottom of the tank together with the more resistant of the organic, as cartilage cells, yellow elastic tissue, horny substances, and cellulose fibres, much of these, however, subsequently undergoing slow disintegration and solution by other chemical or biological means. The deposit thus formed is insignificant in amount and mainly composed of sand and earthy matters, while the bulk of the fluid consists of a clear, dark liquid highly charged with organic matters in solution, and ready to undergo complete and rapid nitrification when brought under appropriate conditions, that is in contact with earth or other pervious materials, with free access of air and pervaded by nitrifying bacteria.

Mr. Cameron, City Engineer of Exeter, in Devonshire, has for the past two years been conducting an experiment on a large scale in the treatment of this principle of the sewage of a section of the city with a population of 2400, availing himself of the action of both classes of bacteria in succession.

The sewage, amounting to 54,000 gallons in twenty-four hours, or at the rate of $22\frac{1}{2}$ gallons per head, equalling, as it always does, very nearly the daily water-supply, is received into a covered tank 65 feet in length by 18 in breadth and 8 feet deep, that is capable of holding a maximum day's sewage and rainfall flowing through it at the rate of $2\frac{1}{2}$ feet per hour. About 10 feet from the end at which it enters is a submerged wall, dividing off a compartment in which grit, paper, and heavy solids are arrested and from which they are removed from time to time. The exit or overflow at the other end extends across the whole width of the tank, in order to equalize the flow, but is placed at a depth of 18 inches below the surface, so as not to disturb the scum. The process going on in this tank is that already described as peptonization; bubbles of inflammable gases are evolved from the surface, but the smell given off from the tank is quite inconsiderable. The effluent is received into a trough with closed ends fixed parallel with the end of the tank, and, being almost devoid of free oxygen, is *aërated* as it flows over each side of the trough in a thin sheet or cascade. It is then conducted

to the so-called "filters," or, as they might more accurately be named, nitrifying beds, consisting of tanks or basins filled with a graduated succession of pieces of porous limestone rock, coarsely and finely crushed, sand and fine coke breeze. There are six tanks in the series, each taking six hours to fill, and being emptied in half an hour by a siphon carrying the effluent to the next, after which the tank is allowed eleven and a half hours' rest for the re-aëration of the filtering materials, and as these require cleansing or renewal from time to time, four only are, as a rule, in actual use. The effluent as it leaves the "tank" contains very little suspended, but a far larger amount of dissolved, organic matter than was present in the crude sewage, with practically no free oxygen; but after having passed through four filters it is decolorized, contains next to no suspended, and but little dissolved, organic matter, is rich in nitrites and nitrates, and is well aërated. It is nearly inodorous, or has at most a faint smell resembling that of raw carrots. The gases evolved in the tank are hydrocarbons and sulphides of hydrogen and ammonium, but in the filters CO_2 is abundantly given off. The suspended solids in the crude sewage, exclusive of the coarse refuse intercepted in the first compartment, would, even if dried, completely fill the tank in the course of three years; yet after twelve months of constant work there was not more than $1\frac{1}{2}$ inches of deposit, chiefly sand and grit.

At Exeter the effluent from the filters is run into the river or estuary of the Exe, which, as far as the city, is a tidal water, without as yet creating any appreciable pollution; but this practice would be decidedly objectionable in the case of an inland town on a river of smaller size, and might be so even there if the sewage of the entire population of 50,000 were so treated to the volume of 1,125,000 gallons instead of 54,000 gallons only. But considering that the effluent contains so large an amount of nitrates and much organic matter in a state ready for immediate nitrification—in fact, all the elements of plant food, without the sludge and slime, the presence of which in crude sewage constitutes a difficulty in the way of its direct application to the soil—it would be far better from every point of view, sanitary and economic, that it should be disposed of by irrigation on arable or meadow land than be wasted by being discharged into river or sea.

Plague Regulations.—The regulations prescribed by the Sanitary Conference recently held at Venice for the purpose of considering measures to prevent spread of the plague are based on the conclusions of the Sanitary Conferences of Venice, 1892; Dresden, 1893; and Paris, 1894, which have been modified to meet the special peculiarities of the plague and in accordance with modern scientific views regarding sanitary precautions for the prevention of the spread of epidemic diseases. The present convention differs from the previous ones on several important points, among which may be mentioned the following: The period of incubation for plague, adopted for the purpose of plague regulations, is ten days. The list of articles of commerce which may be considered "susceptible" has been considerably increased. Modern principles of disinfection are substituted for the obsolete system of land quarantine, but each of the governments parties to the convention may close its frontiers to travellers and merchandise. Each government is to notify other governments of the existence of plague within its

jurisdiction, and must communicate to them a statement of measures adopted to prevent its spread. The area to be deemed infected is strictly limited to the actual town or village where the disease prevails, and no locality is to be deemed infected merely on account of importation into it of a few cases which have led to no spread. Every person departing by vessel must first be examined on shore by medical officers, and no person showing symptoms of plague may be permitted to embark. All infected or suspected articles must be carefully disinfected.

Articles classed as susceptible, importation of which may be prohibited, are used body linen, clothes, bedding, and other personal effects, rags, bagging, carpets, and old embroidery, green hides and skins, raw silk and wool, animal and human hair.

The only articles which must be subjected on arrival to disinfection are clothing, bedding, and similar articles, which have been actually worn or used, or which are carried as ordinary baggage, if they have been brought from an infected place and are considered by the local sanitary authority to be contaminated.

The regulations respecting infected ships are that the sick shall be landed and isolated, and others on board shall be subject in the discretion of the local authority either to "observation," which means detention under observation either on board or in a secure place on shore, for a period not to exceed ten days, or "surveillance," which means that the person is not to be isolated, but may proceed at once to his destination, there to remain under medical supervision. The dirty linen and other effects of passengers and crew which the local authorities may consider likely to be contaminated must be disinfected, and so also must parts of the ship where the sick have lived, and a more extensive infection may be required. The bilge-water must be thrown out after disinfection.

In the case of suspected vessels a medical inspection and the same process of disinfection are prescribed, and it is further recommended that the crew and passengers shall be subjected to "surveillance" for a period of ten days after arrival.

Pratique is to be given at once to a healthy vessel, but at the option of the local authority precautionary measures enforced in case of a suspected ship, except disinfection of the vessel, may be required; and it is also recommended that the passengers and crew shall be subjected to "surveillance" for a period sufficient to complete a term of ten days from the date of departure from the infected port.

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ACUTE INFLAMMATION OF THE GALL-BLADDER.

BY MAURICE H. RICHARDSON, M.D.,
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MY attention was first called to the subject of acute infections of the gall-bladder, not, as might naturally be supposed, in well-known or suspected lesions of the gall-bladder, but rather in those cases in which acute abdominal symptoms suggested most strongly an acute intestinal obstruction or an appendicitis. Acute inflammations of the gall-bladder are by no means uncommon, especially in the course of acute infectious diseases, and as the result of prolonged cholelithiasis. I do not intend, however, to discuss those inflammations of the gall-bladder, whether chronic or acute, which are known to be dependent upon gallstones, upon typhoid fever, upon pneumonia, or upon infectious processes elsewhere, but rather those of sudden onset in patients of apparently perfect health. Though in most of the cases herewith reported no lesions of the gall-bladder, of the bile ducts, or of the liver had ever been suspected, yet careful questioning brought out in several a history more or less suggestive of gallstones in the gall-bladder. In a total of fifty-nine operations upon the gall-bladder, not more than ten cases can be regarded as cases of acute infection without known pre-existing disease.

The subject seems worthy of discussion in connection with that of acute abdominal lesions demanding immediate interference; for acute cholecystitis—acute accidental cholecystitis, if I may thus designate this lesion—though comparatively rare, is more frequent, at least in my experience and in that of the Massachusetts General Hospital, than such well-recognized lesions as intussusception, volvulus, or other forms of acute intestinal obstructions.

The importance of early recognition is quite as great in cholecystitis

as in appendicitis, though, perhaps, it is not so pressing as in those acute intestinal obstructions dependent upon lesions which produce an early intestinal gangrene. Furthermore, the disease under consideration has received but scanty consideration, especially as regards diagnosis. Indeed, the differentiation of this lesion from inflammations of contiguous organs, or even from lesions remote from the gall-bladder, is, with our present knowledge, at times practically impossible. I have therefore ventured to present the clinical, operative, and pathological aspects of a few cases, hoping to suggest points the discussion of which may prove of value in the future.

Acute infections of the gall-bladder are very serious; surgical intervention is almost always demanded. Left to themselves, the cases are liable to result in rupture, or even in gangrene, with escape of septic fluid either into the adherent contiguous viscera or into the general peritoneal cavity. In some instances the process is so violent and the invasion of the gall-bladder walls so extensive that gangrene is produced, the patient's life threatened, and often lost. Very recently an instance of this kind arose in which the lesion was not even suspected before operation, and yet in which the gall-bladder was found to be gangrenous and the focus of a spreading general infection.

CASE I.—Mrs. C. D., a woman of great strength and endurance, aged sixty-two years, a patient of Dr. Chase, of Sharon, was taken Saturday, October 9, 1897, with severe abdominal pain. There had been for seven years occasional attacks of pain, which were supposed to be dependent upon gallstones. The attack of October 9 was the first after an interval of fourteen months. This lasted only a few hours. On Tuesday, October 12th, she was seized with lancinating pains near the anterior superior spinous process of the right ilium. With the attack of Tuesday she began immediately to regurgitate a dark fluid; the abdomen became rapidly distended, everywhere tympanitic and tender, the tenderness being most acute in the region of the appendix. There was no tumor, no localized resistance, no dulness. The ascending colon seemed greatly distended. The pain, which came on in paroxysms, with intervals of apparent ease, was accompanied by loud borborygmi, which suggested mechanical obstruction. The evening temperature of the day before was 99.4° F., the pulse 96; the morning temperature 99°; the noon, 101° F. There was a small femoral hernia. No jaundice had ever been observed. There had been slight loss of weight.

In this case it seemed clear that there was some kind of a mechanical obstruction, probably a malignant stricture of the sigmoid flexure, of long standing, plugged by a solid particle of food, a condition of things which I had often seen. Appendicitis was considered as a possible cause. Whatever the lesion, there seemed to be a serious peritoneal infection, and the prognosis was grave. Under ether nothing new could be discovered; there was no guide to the lesion; no choice for the line of incision. A median cut was therefore made, sufficiently long to explore the whole alimentary tract. The large intestine was normal, the sigmoid flexure and the ileo-cæcal valve healthy, the appendix un-

affected. The gall-bladder, however, was acutely inflamed, distended, black, gangrenous, adherent to the contiguous viscera, and surrounded by a thin, offensive exudate. The right upper quadrant of the abdomen was the seat of a spreading peritonitis. After closure of the abdominal wound the gall-bladder was exposed by an oblique incision. The fundus was aspirated; then, after having been carefully walled about with gauze, freely opened. The gall-bladder contained hundreds of minute gallstones, suspended in a dark, offensive fluid. The gall-bladder was drained, and the wound partly closed. The patient died in eight hours from the original peritonitis and the operative shock. The operation was too late. This was not my first experience in acute cholecystitis, but one of my latest.

Was a diagnosis in this case possible? Could the lesion have been correctly localized, or at least limited to one quadrant of the abdomen, so that the shock of preliminary exploration might have been avoided?

Although it is doubtless true that most cases of acute infection of the gall-bladder—other than those from such sources as typhoid fever, gastro-duodenal catarrh, etc.—are directly or indirectly the result of gallstones, nevertheless, some forms of gall-bladder infection are met with in which the connection between the lesion and the gallstones cannot be established. In four at least of the cases herewith reported no signs of gallstones were perceptible. If the infection was a result or a complication of gallstones in these cases, the stone must have escaped into the duodenum at the very outset of the inflammation, an hypothesis which, in the absence of jaundice, does not seem tenable. It is probably true that in most instances the integrity of the gall-bladder has been impaired by gallstones in such a manner as to invite infection—an impairment especially conspicuous when this viscus has been making violent and prolonged expulsive efforts. In these cases the gall-bladder is often found thickened and contracted; in many the cystic duct is closed. Such pathological changes are doubtless the result of long-continued inflammation and persistent contraction—conditions which have resulted in excessive hypertrophy of the walls, and serious changes in the mucous membrane, changes which in many cases may result in malignant disease. Even in cases of gallstones without contraction or hypertrophy of the gall-bladder, adhesions to contiguous viscera, as demonstrated during cholecystotomies, show that at one time or another inflammation or at least irritation of the gall-bladder has existed. It is through such changes in the structure of the gall-bladder wall that infections generally take place, whatever may have been the means of infection. In those cases of cholelithiasis in which there have been no changes in the gall-bladder or its ducts, and in which there have been no symptoms, the manner of infection admits only of conjecture; indeed, it is hard to see what bearing a few smooth bodies, such as gallstones usually are—bodies with rounded edges, neither large nor im-

pacted—can have in producing a septic infection; for the ordinary experience in the surgical treatment of gallstones shows that in many instances the mucous, as well as the serous, surface of the gall-bladder is unaffected. Moreover, even if gallstones are found in the acutely inflamed gall-bladder, they have in most instances never given the slightest evidence of their presence. We are forced to the conclusion, therefore, that in some instances, at least, gallstones have no influence in the production of the infection, though their presence may indicate an abnormal condition of the bile or the existence of the germ contaminations by which they were originally produced. Gall-bladders in which calculi exist without symptoms may be the seat of some obscure process which facilitates bacterial infection. Be that as it may, the fact remains that acute infections do take place without the influence of gallstones.

The case seems to be different when a gallstone has become impacted in the cystic duct, or has become, through ulceration, imbedded in the gall-bladder wall; for the altered surface distinctly invites infection. An impacted gallstone makes the gall-bladder vulnerable to invasion, just as a fecal concretion makes the vermiform appendix. The analogy between the vermiform appendix and the gall-bladder, however, is not complete for several reasons: the gall-bladder does not resemble closely the appendix in its anatomical structure; in the appendix there is always, at the very seat of the ulceration or the irritation, abundant septic material; in the gall-bladder the bacterial invasion from the alimentary canal must take place through the common duct and the cystic duct, or through the intestine adherent to the gall-bladder. The last channel is an improbable one, however, because adhesions presumably do not take place until after the invasion; indeed, in all cases of acute inflammation of the gall-bladder which I have seen the adhesions have been recent; they have been the result of the infection rather than the means. Invasion through the medium of the blood would seem to be the only explanation of those infections which take place in the normal gall-bladder, in the absence of calculi and of infection of the bile ducts. Furthermore, with reference to the invasion of the gall-bladder through the common duct, in practically all instances of acute cholecystitis that I have seen there has been no indication whatever of disease of the bile ducts, cystic, biliary, or common; there has been no gastro-duodenal catarrh, no plugging of the common duct, no general liver infection. Had any such complications been present in Case I., herewith reported, the source and channel of infection would have been obvious.

In the disease under consideration, the great distention of the gall-bladder always present suggests a possible cause of infection, the over-distention interfering more or less with the circulation of the gall-

bladder wall, and thereby inviting bacterial lodgement. Carried to an extreme degree, the distention may result in complete stasis, causing total gangrene.

Distention of the gall-bladder is certainly an important factor in acute cholecystitis. At the outset the distention may be due to an irritation at the mouth of the cystic duct, with closure often caused by the pressure or the irritation of a gallstone, without impaction. An overdistention results, which closes still more tightly the cystic duct. Finally, by bulging of its walls a valve-like action is produced upon the duct, by which the greater the pressure the tighter the valve. The causation of distention is not unlike that in an intermittent hydronephrosis. It is doubtless as true in the gall-bladder as in the kidney, that overdistentions tend to relieve themselves; yet at times the distention is, from the beginning, sudden and complete. These are the cases which without premonitory signs result in acute inflammation. I have seen, for example, two cases in which pain of an intermittent character in the right hypochondrium has suggested gallstone colic. These symptoms, persistent, distressing, disabling, seemed to justify interference. Cholecystotomy relieved completely the symptoms, but did not explain the intermittent and painful distention which caused them; for in neither instance was anything abnormal found—there were no gallstones, the gall-bladder walls were unaffected. Obstruction to the flow of bile, whether by impaction of stones in the biliary passages or by closure of the cystic duct, favors rather than hinders an ascending infection. Experiments show that ligature of the large bile ducts does not prevent infection, but renders it more liable to occur (Horman: *Cent. für Bakt.*, 1895, p. 48). The inference is that obstructing calculi act in the same way.

The shape and size of an acutely inflamed and distended gall-bladder do not differ materially from those of a chronically distended one, except that the former assumes its altered shape suddenly, and is not influenced by those adhesions which almost always exist in lesions of long standing. In acute distention the gall-bladder usually attains its greatest elongation toward the long axis of the body, in the direction of the foramen of Winslow. In such cases its depth is often remarkable. The attachments to the liver hold the fundus against the abdominal wall; its circular fibres prevent dilatation from side to side. Elongation must, therefore, take place upward and inward, in the direction of the long axis. The escape of bile through the cystic duct is doubtless impeded in this form of distention more than in any other, the dilated base forming a pouch above the mouth of the duct, which is thereby compressed and more or less completely closed. Whether such valve-action is produced or not, the subsequent history of these cases would seem to indicate that excessive distention does in some way add to the

difficulties of drainage through the cystic duct, for in most, if not in all cases, drainage through the abdominal wound is followed in the course of a few days by the flow of normal bile, even though at first nothing but mucus, pus, or decolorized bile escapes.

It seems not unreasonable, therefore, to conclude that in many cases, and in fact in all in which no stone is found impacted, the cystic duct is first closed or at least obstructed by swelling of its mucous membrane, and that this obstruction is augmented by dilatation of the gall-bladder and pressure upon the cystic duct.

The shape of the dilated gall-bladder is usually conical, whatever the direction in which its fundus may point. Not infrequently its conical fundus points directly downward. In this form of dilatation its size may be excessive, and it lies, in most cases, over the descending colon. In one instance it was buried among the intestines, though not retro-peritoneal.

The degree of distensibility depends upon the strength and thickness of the walls of the gall-bladder and upon the adhesions. In the cases especially under consideration in which no previous symptoms have been prominent, the gall-bladder has usually been thin-walled and its dilatation excessive. In some instances the attachments between the liver and the gall-bladder are very strong and thick, the gall-bladder appearing as a rounded, sessile tumor upon the under surface of the liver. In such instances the dilatation has been downward, and the shape globular.

As a rule, the septic gall-bladder is symmetrical, not irregular. It has a distinctly abnormal feel. The sensation which such a gall-bladder gives to the finger is that of a resistant, adherent, but easily separated viscus. It feels like the acutely inflamed and thickened vermiform appendix surrounded by omentum and buried in easily-yielding adhesions. This pathological condition, which in most cases is recognized first by the finger, is characteristic and very important. Many instances might be given in which the situation of a serious abdominal lesion is detected by this peculiar condition of acute inflammation with recent, easily separated, granular-feeling adhesions.

The gall-bladder itself varies in its appearance to an extreme degree. When distended by healthy bile, by thin mucus, or by decolorized bile, the gall-bladder is translucent, and its peritoneum unchanged. When a septic lesion is present, the surface of the gall-bladder is opaque, granular, and roughened. The color varies: it may be pink, red, dark red, green, light green, dark green, hemorrhagic, and even black. The variation of the gall-bladder in color and consistency is not unlike that seen in various acute lesions of the intestine—lesions varying from acute septic inflammations of the intestinal walls to the necrotic changes of advancing gangrene.

The contents of the gall-bladder are usually dark in color, purulent, puriform, or hemorrhagic. In most cases the gall-bladder contains bile recently changed. It is usually dark green, and contains mucus and blood. Odor is generally absent, except in complete gangrene.

The presence of a clear fluid, of a white fluid, or of a simple mucus is not to be expected in the acute inflammatory cases. Such a fluid is almost invariably aseptic, like bile itself.

The mucous membrane on the inner surface of the gall-bladder is acutely congested—bright red, dark red, brown, dark brown, green, light green, dark green, hemorrhagic, or gangrenous. In many instances the mucous membrane resembles the interior of an acutely inflamed appendix. If not a necrotic process, it is the beginning of one, sufficiently established to substitute a green or a black for the normal color. Drainage is usually followed by restoration of the mucous membrane to its natural appearance. Often the supernatant fluid is comparatively light in color, the lower portions dark or purulent.

In all the acute inflammations of the gall-bladder that have come under my observation, easily separated adhesions have attached the gall-bladder firmly to all contiguous structures. In such cases the septic process has passed through the gall-bladder walls, even though gangrene has not been present. The inflammation, after a few days, results in a considerable thickening of the wall, with so much friability that stitches easily tear out. In some instances a bulging of the internal layers of the gall-bladder through the serous surface will be seen here and there. These bulging areas indicate a threatening rupture, and are due to necrotic changes in the bladder-walls.

Surrounding viscera—the hepatic flexure of the colon, the transverse colon, the duodenum, or even the stomach—may share in the septic process. The peritoneum of these surfaces is reddened, finely granular, and adherent.

Such are the usual anatomical appearances as observed upon the living by the surgeon. They doubtless differ materially from those seen at the autopsy-table.

The anatomical situation of the gall-bladder influences materially the extension of infections. The viscera in direct contact are the duodenum, colon, omentum, liver, and kidney, and sometimes the stomach. In the right upper quadrant the gall-bladder is to a certain extent shut off from the rest of the abdominal cavity, and extravasations are to that extent retarded. I called attention to this isolation of the gall-bladder in a paper on the "Surgery of the Gall-bladder," read before the American Surgical Association at Buffalo in May, 1893, as follows:¹

"The right upper quadrant of the abdomen, containing the liver,

¹ *Annals of Surgery*, 1893, vol. xviii. p. 388.

gall-bladder, and portions of the kidney, stomach, and duodenum, is separated from the peritoneal cavity below by the transverse and ascending colon, with their mesentery. The colon is usually in contact with the abdominal wall from the ileo-cæcal valve to the splenic flexure. Extravasations will be immediately opposed by this intestinal and mesenteric barrier, which may, however, be avoided by travelling downward along the right border of the ascending colon. In extensive extravasations the fluid will easily overcome any such obstacle, but in the slow escape of bile the opposing surface will be sufficient to prevent, by rapid adhesion-formation, any considerable infection. Anteriorly and toward the median line the stomach and duodenum act as more or less efficient barriers; posteriorly the fluid may enter the lesser cavity of the omentum through the foramen of Winslow."

The bacteriology of acute inflammations of the gall-bladder is a chapter as yet incomplete. The bacillus coli communis, from the frequency of its presence, seems to have an important rôle in producing gall-bladder infections. It must be borne in mind, however, that this prolific organism is very apt to crowd out of notice others which have much more pathogenic importance. From the contiguity of the gall-bladder to the alimentary canal, the colon bacillus is especially liable to infect the biliary passages, though the channel of infection may be difficult to determine. Should the bacillus make its way from the duodenum through the common duct and through the cystic duct, some evidence either of its source or of its progress would necessarily exist. Such evidence, however, is rarely if ever present. It must be admitted, however, that the urgency of these cases does not permit examination of the bile ducts; for the surgeon must be content with simple drainage of the gall-bladder itself. The rapid relief of symptoms afforded by drainage would seem to indicate that no general biliary infection exists.

The commoner infections of the gall-bladder naturally take place by contaminations from the intestinal tract by means of those micro-organisms always present in the healthy intestine. The nidus of infection is ever present; direct channels of invasion are ever patent; yet in some instances an infection takes place through the malign influence of bacteria that do not exist in the body in a state of health. Such, for instance, is the infection of the typhoid bacillus in patients seemingly well. Infections by the diplococcus of pneumonia may take place in the gall-bladder without involving the lungs or other organs. Indeed, this organism may invade the peritoneum, the appendix, the pericardium, as well as the gall-bladder, without affecting the lungs at all. Such infections have been recently observed at the Massachusetts General Hospital. In one case there was a fatal general peritonitis in which pure cultures of the diplococcus of pneumonia were obtained. Mixter has recently

operated upon a case of appendicitis in which the appendix was perforated and gangrenous, and in which pure cultures of the diplococcus were found. In one of the cases here reported the gall-bladder had been infected by this micro-organism ; in another by the typhoid bacillus. These clinical observations throw some light upon the question of the diversity and the malignancy of such bacetria ; they suggest the possibility of a remote bacterial origin in obscure cases ; they confirm the theory that in the comparatively healthy body a great variety of pathogenic bacteria may be present, ready to implant themselves upon an inviting field.

In Case IX. the typhoid bacillus was found. The disease had not been suspected ; no case of typhoid had been known in the community in which the patient lived. It was only after careful questioning that a semblance of typhoid history could be obtained. Yet the culture showed a micro-organism which withstood the most rigid tests. The influence of the different forms of infection is not manifest from any observations that I have been able to make ; those from the colon bacillus, the typhoid, the pneumococcus, did not differ materially ; those from the typhoid and the pneumococcus were, perhaps, less fulminating than those from the colon bacillus. In the fatal cases the cultures either were lost or were not taken. Further observations in this interesting class of visceral infections are necessary.

The symptoms of an acute cholecystitis, as I have observed them, have been those of a confined abscess at the border of the right costal cartilages in the vicinity of the tip of the tenth rib. They may be those of an acute inflammation of the vermiform appendix situated near the liver ; they may be those of an acute intestinal obstruction ; they may be those of the sudden closure of an organic intestinal stricture ; they may suggest an inflammatory process in a diseased kidney, an acute pancreatitis, an extravasation from the stomach, a malignant abdominal tumor, a tumor with a twisted pedicle.

In acute cholecystitis of whatever origin, pain is the first, the most important, the most invariable symptom. It is usually severe and paroxysmal. It is situated in the right half of the abdomen, though not always localized in the region of the liver ; it may be in the normal situation of the gall-bladder ; it may be in the epigastrium, or it may be referred directly to the usual seat of the vermiform appendix. In many cases the pain becomes localized in the region of the gall-bladder ; in a few it persists in areas remote from the liver. With the onset of pain are other symptoms of bacterial infection—nausea, vomiting, rise of pulse and temperature, prostration, distention of the abdomen, rigidity, general tenderness becoming localized, or localized tenderness becoming general. Often the symptoms are strongly indicative of a general peritoneal infection. Chill may or may not be present. Jaundice is seldom seen, unless the in-

fection involves the bile duct. Vomiting, an almost invariable symptom, may be intermittent and transitory, or may be persistent. As a rule, the initial violence subsides, and the vomiting, which was at first excessive, becomes slowly diminished, to reappear, however, in case the infection becomes general. Tenderness is always found, and is generally more extensive than the lesion would seem to indicate. In this respect acute cholecystitis resembles appendicitis. The temperature is moderately high, and the pulse seldom over 100. In this disease, however, as in other peritoneal infections, the temperature seems to depend largely upon the character and virulence of the micro-organism—some causing mild constitutional reaction, others violent. The rate and quality of the pulse are reliable guides to the depth of constitutional depression. The temperature indicates an infection of some kind, but is less to be depended upon than the pulse. As in some general infections of the peritoneum, a hopeless lesion may be present with a temperature and pulse practically normal, so in acute infections of the gall-bladder the constitutional disturbance is no infallible indication.

The bowels are unaffected for the first hours of the attack. They may be unaffected throughout; yet in a certain number of cases there is complete stoppage of gas and feces. Such a condition is owing, not to a general peritonitis with intestinal paresis, but to some other cause. In three of the following cases the symptoms were such as to suggest very strongly an acute obstruction. In two of the few cases of cholecystotomy reported in the last ten years, one by Lane¹ and one by Murphy,² there were symptoms of acute obstruction. In Lane's case an acute obstruction was supposed to exist; in Murphy's an acute cholecystitis. Both were acute infections of the gall-bladder, and both recovered after drainage.

The symptoms of acute obstruction may point, however, toward the seat of the lesion, which, on exploration, will prove to be the gall-bladder. Yet, occasionally, as in Case I., the obstructive symptoms do not indicate in the least the point of stoppage. The cause is hard to tell. Lane attributed it to the paralyzing effect of the inflammatory exudate upon the hepatic flexure of the colon, with resulting paralysis; for beyond this point the colon was collapsed. In Case V. the autopsy showed a constriction at the hepatic flexure, caused by an inflammatory exudate. In the two other cases of apparent obstruction there was a peritonitis involving the whole right upper quadrant. The symptoms may have been owing to the paralyzing effect of the infection upon the contiguous coil. With the constipation of gas and feces there may be violent peristalsis and loud borborygmi—symptoms strongly confirming

¹ *Lancet*, 1889, vol. i. p. 411.

² *Twentieth Century Practice*, vol. ix. p. 731.

the possibility of an acute obstruction. Rigidity of the abdominal wall is present in the early stages of the initial peritonitis. This rigidity is right-sided, and soon accompanied by distention. As the infectious process becomes more firmly localized, the rigidity slowly disappears, until a swollen and tense gall-bladder can be felt. Often the distention persists or increases, so that the gall-bladder, masked at first by the abdominal rigidity, is later too deeply buried for palpation.

The distended gall-bladder can sometimes be felt in its normal position; in a certain number it cannot. Failure to palpate the tumor may be owing to the rigidity or to the distention; it may be owing to an unusual form of enlargement, by which it is more or less covered by the stomach, duodenum, or colon. When enlarged, lobular, and in contact with the abdominal wall, it can usually be felt, though not always, even when there is excessive distention.

In unfavorable cases, or in cases in which operation has been too long delayed, the symptoms of general peritonitis supervene. Fortunately, for reasons already given, the infectious process is successfully limited to the right upper quadrant, unless the gall-bladder wall suddenly gives way and floods with its septic contents the whole peritoneal cavity.

A correct diagnosis of acute cholecystitis may be extremely easy; it may be extremely difficult; it may be impossible. When it complicates typhoid fever, pneumonia, or cholelithiasis, the true nature of the lesion is of course at once suggested. The detection of a tender tumor close to the liver, at the usual seat of the gall-bladder, after an attack of sudden pain, nausea, vomiting, with rise of temperature and pulse, makes the diagnosis almost certain. It is necessary, however, to discriminate between the tumor of an inflamed gall-bladder, an appendicular abscess high up, a pyonephrosis, a subphrenic abscess, a suppurative pancreatitis, a localized peritonitis from gastric or duodenal extravasations caused by ulcers or foreign bodies. Symptoms appearing in persons of previous good health in whom, if suspected, gallstone symptoms have been transitory and slight, or in patients absolutely without a previous gallstone pain, point to the gall-bladder with certainty only when the tumor is, from its position, shape, and relations, undoubtedly a gall-bladder—that is to say, when it is smooth, well-defined, rounded, moving with the movements of the liver. When the tumor is immovable, indistinctly outlined, its dulness gradually lost in a surrounding tympany, when, in other words, it is an indistinct mass buried among the viscera of the right upper quadrant, and especially when the surface of the abdomen over the tumor is adherent and reddened, its true nature admits only of conjecture, unless a history of gallstones can be obtained. Such a history, no matter how vague, should incline toward cholecystitis. On the other hand, the confounding lesions have each its suggestive history. A correct discrimination cannot always be made, however. In fact, in some

cases nothing more than an indefinite inference can be drawn. Moreover, many cases are so urgent that exploration cannot be deferred for a careful study of the case. I have seen, for instance, several tumors dependent upon conditions of great rarity close enough to the gall-bladder area to be readily confounded with a gall-bladder. Not to mention the ordinary subphrenic abscess, I have seen five cysts of the pancreas, an epigastric abscess probably pancreatic, a pancreatic hemorrhage with tumor, two cases of abscess about the pylorus and duodenum—one owing to a safety-pin sticking through the pylorus; the other to a collection of gum in the stomach, swallowed from time to time by a neurotic girl. In none of these cases could the gall-bladder have been positively ruled out as a possible cause.

An exact discrimination between such infections is not indispensable, for the indications for interference will guide the surgeon to the lesion, whatever it may be.

The case is different when the symptoms are so indefinite that we can only guess from what quarter of the abdomen the infection proceeds—whether from a gall-bladder or a normally-seated appendix; when they point quite as clearly to an acute intestinal obstruction as to an acute cholecystitis. It is at times impossible to discriminate between acute cholecystitis and inflammation of the vermiform appendix. It is not strange that confusion should arise between these two infectious processes, for in many ways they are alike: the nature of the infection is the same; the relation to the peritoneal cavity the same; the symptoms of rigidity, of general tenderness, of distention the same, and the constitutional infection the same. Moreover, the bacterial influence is often identical. The only discriminating signs of importance are the situation of the pain and tenderness and the presence and seat of the tumor.

In the three cases supposed to be appendicitis the symptoms were apparently so clearly appendicular in their origin that the incision was made over the appendix. The cardinal symptoms of appendicitis were present—pain, vomiting, tenderness over the appendix, fever. In two there were right-sided rigidity and distention. In none could any tumor in the gall-bladder region be felt, even under ether; nor could any resistance or creak be detected in the region of the appendix. The absence of perceptible tumor does not disprove appendicitis any more than it does cholecystitis. In none of these cases was there a history pointing in the least toward gallstones. An exact discrimination was therefore impossible. Could the cases have been watched from the beginning, with the idea that the lesion might be in the gall-bladder, it is possible that a more accurate localization of the initial infection might have been made. The difficulty of diagnosis under such conditions will be generally admitted.

In other instances the symptoms may not indicate even the half of the abdomen involved. Pain, vomiting, distention, constipation, paroxysmal peristalsis—visible distended writhing coils, without tumor or other localizing signs—these symptoms point toward an acute intestinal obstruction of uncertain origin; they may be appendicular, peritoneal, intestinal, pancreatic, cholecystic—they may be from a general peritoneal infection; they may be from an acute mechanical obstruction. In the absence of a history pointing, no matter how indirectly, to the appendix, the intestine, the pancreas, or the gall-bladder, the diagnosis is too uncertain to guide the exploring incision. In two of my cases of acute cholecystitis, in which acute intestinal obstruction was suspected, a tumor was present in the region of the hepatic flexure of the colon; in one there was no guide. In the two former the lesion was at once discovered and treated; in the last a serious preliminary search could not be avoided.

The chief importance of an exact diagnosis in these lesions is for the selection of a suitable incision. When the symptoms point more to the gall-bladder than to the appendix, the incision should be made over the gall-bladder; when to the appendix more than to the gall-bladder, it should be made over the appendix. When the operator is in doubt as to which organ is affected, the cut may be made over a not uncommon situation for the appendix, behind the cæcum, high up. The opening will then be made about half-way between the ordinary situation of the appendix and the gall-bladder, to be enlarged in either direction as the information gained may determine. Whenever the symptoms are general—when there is neither a persistent pain nor a localized tenderness; when there is no tumor; when there is no history pointing to a definite lesion—the incision must be made in the median line.

The treatment of an inflamed gall-bladder consists in so draining that viscus as not to infect the surrounding peritoneum. As soon as the gall-bladder is well exposed, all the points about it should be packed abundantly with gauze. The tension should then be relieved by aspiration. The next step consists in suture of the fundus of the gall-bladder to the abdominal wound. The gall-bladder is then either freely opened and washed out with sterile water, or it is carefully wiped with sterile gauze. Gallstones are removed, if any are present, by the use of suitable instruments. A pliable rubber tube should then be passed to the bottom of the gall-bladder, accompanied by a strip of gauze. The external wound should be closed, except just below the gall-bladder, where a small strand is left between it and the duodenum. Further exploration should not be made. A gall-bladder hopelessly necrotic should be removed.

In almost every instance of acute inflammation, and, in fact, in almost all cases of chronic inflammation of the gall-bladder with closure of

the cystic duct, drainage is followed in the course of a few days by an abundant flow of bile through the cystic duct. After drainage the duct becomes pervious, either from alteration in the shape of the gall-bladder or from subsidence of the acute inflammatory process. The operator may expect, almost without exception, to see in the course of thirty-six or forty-eight hours, bile appear through the drainage-tube, even if the gall-bladder has no bile whatever in it at the time. With the subsidence of the inflammation of the gall-bladder and of the cystic duct, the gall-bladder resumes its functions as a reservoir; it empties itself from time to time through the cystic duct to carry on digestion; the opening in the fundus of the gall-bladder gradually closes, and the patient is fully restored to health.

The prognosis in acute inflammation of the gall-bladder is grave; with timely interference it is highly encouraging. In most of the cases that I have operated upon recovery has followed. What the course would have been had the cases been left to themselves it is impossible for me to say.

From the rapid extension of the gangrenous process and its necessarily grave consequences when operation is not resorted to, from the fatal results observed even after operation in cases far advanced, I cannot but think that the outlook is extremely serious, and that acute cholecystitis demands interference even more strongly than appendicitis. In cholecystitis, as in appendicitis, some varieties are more serious than others. Those in which the process does not destroy the integrity of the gall-bladder wall may result in empyema, or in a gradual subsidence of the inflammation, absorption of the septic fluid, and permanent contraction of the gall-bladder; those in which a necrosis of the gall-bladder ensues must be regarded as essentially fatal.

CASE II.—H. A. W. This man, aged forty years, I saw on Thursday evening, February 8, 1894, with Dr. Davis, of East Somerville, Mass. At 12 o'clock the night before he had been seized with pain in "the pit of the stomach." There had been no indiscretion of any kind. At 10.30 Thursday morning he began to vomit, and vomited all through that day until my visit. The vomitus was at first yellow, then coffee-colored.

Five years before he had had "inflammation of the stomach," never before or since. He had been a very strong and healthy man. The attack of inflammation of the stomach was accompanied by continuous vomiting and a good deal of pain.

The temperature on the morning of the attack (Thursday) was at 97° , where it remained until after the pain ceased. The pulse was 60. At 6 P.M. the temperature was 100° . About 6 o'clock he vomited, and the pain suddenly ceased. The pulse, however, continued to rise, and vomiting recurred. At 9 o'clock the temperature was 100° ; at 11.15, 101° . The pulse was 108, of poor quality.

The general appearance of this patient was unfavorable; his color bad. The abdomen was distended and rigid; the skin circulation slug-

gish. No tumor could be made out. The tenderness was general, but more on the right than on the left. The lesion was supposed to be appendicitis, with a general infection. A grave prognosis was given.

The incision was made midway between the appendix and the gall-bladder. The appendix was found to be deeply buried in old adhesions, and inseparable except with great difficulty from surrounding structures. There was no evidence of recent appendicitis. The region of the gall-bladder was next explored; here a globular tumor could be felt adherent by easily separated adhesions to the contiguous viscera. The cut was extended upward, and the gall-bladder explored. The edges of the gall-bladder were sewed to the abdominal wound, and the contents drained. No gallstones were found. The patient made a good recovery, in spite of the unfavorable prognosis.

Cultures from the contents of the gall-bladder showed the bacillus coli communis.

CASE III.—On Saturday, August 24, 1895, I saw Mrs. E. J., aged sixty-one years, a patient of Drs. Howe and Pillsbury, of Newburyport. She had never had any sickness until the present attack, which began on Tuesday, with pain in the abdomen, though she had been complaining for about two weeks that the abdomen was sore. When the soreness in the abdomen first came on she took some kind of cathartic. She had been inclined to constipation, for which she had been in the habit of taking physic.

The pain became so severe by Thursday that she sent for medical aid. Dr. Pillsbury found her suffering with severe paroxysmal pain in the right side of the abdomen. There was nausea, with vomiting of small quantities of bile. The temperature on Friday morning was slightly above normal; on Saturday morning, 101°. A tumor filling the right side of the abdomen had been discovered on Thursday as soon as the pain had become fully controlled by an opiate.

The family history was decidedly phthisical, most of the relatives on the mother's side having died of consumption. The bowels had been completely constipated. Two quarts of soap-suds had been injected without effect. The urine was normal. Nothing unusual in the way of food had been taken. The pain had been controlled by morphia, taken hypodermically and by the mouth. I found the abdomen distended and tender. The right half was filled with a tense and extremely tender tumor, the dulness of which was continuous with that of the liver. The whole abdomen was rigid. The patient was in great pain.

Careful questioning failed to elicit any symptoms of previous gall-stone colics, of gradual invasion of malignant disease in any form, of obstructive lesions or their causes, of renal or pelvic disease. There had been no loss in weight, no typhoid fever or dysentery, no intestinal colic, no pelvic symptoms, no abnormal sensations in the abdomen, no rupture, no hiccups. It was clear that a grave abdominal emergency was present, the chief indications of which were indefinite pains for two weeks, increasing to violent paroxysms, obstipation, vomiting, abnormal distention, right-sided tumor.

There were considered acute and chronic obstruction, tumor with twisted pedicle, inflammation of the gall-bladder, abdominal abscess, and appendicitis. No diagnosis was made. I was inclined to believe it to be a tumor with twisted pedicle. Under ether a smooth, round tumor could be felt in the region of the ascending colon. The tumor was con-

ical, and pointed downward. It seemed, then, likely that there was a malignant growth of the intestine causing obstruction. Appendicitis was not seriously considered. The abdomen was opened immediately by an incision beginning at the usual seat of the appendix. The tumor was found to be a distended gall-bladder containing about a hundred faceted gallstones. The gall-bladder was everywhere adherent by recent inflammation. It contained about a pint of bile, having a peculiar, sweet odor. The edges of the gall-bladder were attached to the abdominal wound, and a large drainage-tube fastened into the gall-bladder.

In this case the bedside impression was strongest in favor of a mechanical obstruction suddenly developing in the course of slowly increasing malignant obstruction. The temperature, to be sure, was indicative of a septic process, but the temperature has, as a rule, little significance in acute abdominal lesions. It was clear that some acute emergency was present, and that exploration was imperative; a diagnosis, however desirable, was of secondary importance.

The patient made a rapid convalescence, and has been perfectly well ever since. No bacteriological examination was made.

CASE IV.—February 7, 1894. Mrs. W. B. J., aged seventy-four years, a patient of Dr. H. W. Boutwell, of Manchester, N. H., had had for five years an obscure trouble in the abdomen which had been regarded as a floating kidney, or a malignant tumor, etc. Three months before I saw her she had complained of a sharp pain in the right side. Dr. Boutwell had found a small, rounded, painful tumor. The pain was so sharp that it "took her breath away." There was no fever. When the bowels were full of gas the bunch was more painful. Before this trouble began she had been a remarkably strong woman. Five weeks before my first examination she had renewed pain, with vomiting and dizziness. During the winter she had lost considerable weight. There was no jaundice. I found a tumor in the right side of the abdomen, about at the level of the umbilicus, not far outside of the right linear semilunaris; it was hard, smooth, and tender. There was some tympanites over it, and the gurgling of gas could be heard going by it. The borders of the tumor were blended into the surrounding parts. The pulse was 82; the temperature normal. The intestinal coils could be seen contracting under the thin abdominal walls.

In view of the progressive emaciation, the situation of the tumor, the exaggerated intestinal peristalsis, the gurgling at the seat of the tumor, the loss of weight, and the absence of temperature, it seemed probable that this was a case of malignant tumor involving the ascending colon. An exploration was undertaken, however, because of the uncertainty of the diagnosis.

The tumor was exposed by separating the intestines and lifting the ascending colon. It proved to be a dilated gall-bladder with thickened walls. The contents were yellow pus. The woman made a good recovery from the operation, and did fairly well for several days, when she died of exhaustion.

CASE V.—John K., aged twenty-eight years, a glazier, entered the Massachusetts General Hospital May 1, 1896. He had always been well except for lumbago. The day before entrance he awoke with griping pain in both groins. This pain grew worse during the day, so that morphia had to be given subcutaneously. The bowels moved twice. The following morning he began to vomit, and vomited all day. The

bowels were moved by enema on the day of admission to the hospital. He was a large, well-nourished, well-developed man. On entrance, the temperature was 102° , pulse 108; general appearance good. The abdomen was slightly distended and rigid, chiefly on the right side. The pain was described as being over the crest of the right ilium and running into the back. There was pain and tenderness at McBurney's point. There was no dulness or cake. The case seemed to be an urgent one, and an operation was decided upon at once. The diagnosis was acute inflammation of the vermiform appendix.

An incision five inches in length was made over the usual seat of the appendix. The appendix itself was found normal, two inches in length. When the peritoneal cavity was opened there was evidence of general infection. As the condition of the appendix did not explain the obvious peritonitis, the hand was introduced. The gall-bladder was found to be tensely distended and everywhere adherent. The incision was thereupon extended to the lower costal border. The gall-bladder was dark in color and had the appearance of acute gangrene. The intestines were walled off on all sides with gauze, and the lower part of the incision was closed with silkworm-gut sutures. The gall-bladder was then aspirated, and several ounces of bloody, gelatinous bile were drawn off. The gall-bladder was then sewed to the abdominal wall and the fundus opened for the insertion of a medium-sized drainage-tube. The bladder was packed about with sterile gauze. The wound was closed everywhere except where the drainage-tube and gauze emerged.

On the next day bile escaped freely through the tube. On the third day the abdomen became distended and the patient began to vomit. An intestinal coil presenting in the wound was incised; much gas and fecal matter escaped. Death took place on the fourth day. Autopsy showed a general septic peritonitis and a gangrenous gall-bladder. There were no gallstones. The hepatic flexures of the colon were covered with fibrin, and its lumen was nearly occluded by adhesions.

CASE VI.—Major G. S. M., aged fifty-six years, Lawrence, Mass. I saw this gentleman, a stout, rugged man of great energy, on September 14, 1896, with his physician, Dr. O. T. Howe, of Lawrence, and Dr. F. W. Johnson, of Boston. He was in extreme distress. The abdomen was distended, everywhere painful and tender. There were constant vomiting and hiccough. The temperature was 103° ; the pulse irregular and weak, between 80 and 100. In the region of the gall-bladder there was a tense, rounded, tender tumor. There was no jaundice. It appeared that for some six months the daughter of the patient had noticed that he did not look as well and had not acted as well as usual. On September 9th, five days before I first saw him, Dr. Johnson attended him in Boston. He was then complaining of pain in the epigastrium, a little to the right. He had been subject at times to this pain. When seen on the 9th by Dr. Howe, he was in a state of collapse. The temperature was 103° ; the pulse slow and weak at 70. The body was cold and covered with sweat. The pain was intense, and required repeated hypodermatic injections of morphine, from a quarter to a third of a grain each time. The patient remained practically in this condition until I saw him on Monday, the 14th. The temperature had remained in the vicinity of 103° ; the pulse had become gradually poorer in quality. On Wednesday he himself had noticed a very tender spot, hard to the touch, which he indicated was in the region of the gall-

bladder. From that time his condition grew decidedly worse. In the afternoon of Wednesday he began to vomit, and the vomiting was more or less continuous until I saw him on Monday. The bowels were open on the first and second day. On Sunday the pulse was weak, rapid, and irregular; the temperature 102.5° to 103° . There were vomiting and hiccough. I made a diagnosis of acute inflammation of the gall-bladder, depending chiefly upon the situation and physical characteristics of the tumor. Although the patient was in an extremely grave condition, it seemed imperative to operate at once. The tumor was exposed by a short incision. The gall-bladder presented in the wound. It was thickened, darkly congested, friable, and everywhere adherent. There was no evidence of a general infection of the abdominal cavity. The contents of the tumor were first removed by aspiration. The gall-bladder was then incised and its edges sewed with silk to the margin of the abdominal wound. A drainage-tube was fastened into the gall-bladder, and a small amount of gauze was placed outside and below the gall-bladder wound. The rest of the abdominal wound was closed by interrupted sutures.

Though operation was a brief one, the patient stood it badly. He was put to bed, and seemed to be near his end. The respiration was shallow and hurried, the color was bad, the pulse extremely irregular; there was constant vomiting. For two or three days this gentleman was in a very precarious condition; he then began to mend slowly and normal bile began to escape through the tube. He made a very satisfactory recovery, and was able to return to his professional work at the end of a few weeks. Cultures from the aspirated fluid showed a mixed infection of bacilli and cocci of various sizes. It was impossible to determine their nature or their source.

CASE VII.—Mrs. C. M., a patient of Dr. C. W. Stevens, of Charlestown, I saw on September 17, 1896. She was thirty-three years of age, had had one child, and was two months pregnant. There had never been any previous disease, nor had there been any unpleasant symptoms; in fact, she had always been very well.

On September 6th she was taken with cramps confined to the epigastrium, with more or less constant vomiting. There had been no rise of temperature. Dr. Stevens thought that there were symptoms of intestinal obstruction, as he was unable to move the bowels.

Following the first attack of cramps, September 6th, there had been three others. The pain seemed to go up into the shoulder-blade. There was no jaundice. There had been no previous history of pain, paroxysmal or constant.

The cheeks were somewhat flushed. The pulse was 100; the temperature 100° . The general appearance was good. Under the liver, in the normal position of the gall-bladder, there was a tender tumor, like that of a distended gall-bladder. The patient stated that she had had these cramps in the gall-bladder for a long time, but she had never been jaundiced. The abdomen was not especially distended, and was neither tense nor rigid. There was an absence of the reflex abdominal symptoms seen in the other cases. An operation for draining the gall-bladder seemed imperative, although the condition of pregnancy contra-indicated operative interference unless it was absolutely necessary.

On the following day the tumor was exposed. It proved to be a gall-bladder. The fluid was withdrawn with the aspirator. A number of

gallstones were then removed. A drainage-tube was fastened into the gall-bladder after its edges had been sewed to the abdominal wound. The patient made a very satisfactory recovery. Some weeks after the complete healing of the wound the patient began to have renewed pain, with a slight rise in temperature. Examination of the scar showed a tender tumor, which was evidently due to a refilling of the gall-bladder. An opening was made through the scar, and a couple of ounces of perfectly clear fluid were withdrawn. From that time until the present it has been necessary to keep a sinus at this point. Most of the time there has been a discharge of clear fluid, which is perfectly aseptic.

The failure to find any bacterial invasion of the gall-bladder in this case removes it somewhat from the category of cases under consideration. The distention seems to have been an acute mechanical one. What would have happened in case no drainage had been attempted is problematical. On the chances, an empyema with septic infection would sooner or later have taken place. That there was some infection at the time seems probable, in spite of the failure of the bacteriological examination.

The condition of the gall-bladder in this case was not that which I usually have found in acute infectious cholecystitis, for its walls were smooth, the peritoneum was not altered, and there were no adhesions. The mucous surface of the gall-bladder was reddened and injected.

CASE VIII.—Dr. F. E. K., aged thirty-four years, I saw at Nashua, N. H., November 30, 1896. This gentleman, who was rather spare and not in especially good condition, was taken on the morning of November 29, 1896, with what was supposed by himself and by his physician to be appendicitis.

On Saturday, the 28th, he had an attack of epigastric pain, which was relieved by morphine. That night he was very restless, and had tenderness over cæcum. On the following morning he went to his office, but he was obliged to give up his work and go home. His temperature was then 101°. In the afternoon he had severe pain and tenderness over the region of the cæcum, with distention. The bowels moved well.

On inquiry I found that he had always been subject to trouble with digestion, and had often suffered pain; in fact, he had had two attacks of pain before the present one. The pain would last through the night, and was unattended by jaundice. His physician, Dr. Wallace, said that he was jaundiced after an attack of scarlatina two years before. Up to the preceding Saturday he had been attending to his work, and had been better than usual. On Saturday and Sunday he vomited, but there had been no vomiting on Monday.

I found the pulse between 96 and 100; the temperature 101°. The general appearance was good. There was extreme tenderness over the ascending colon, and also over the region of the appendix. Immediate operation was advised. The abdomen was not especially distended. Even after etherization no tumor could be felt. It was supposed to be a case of acute appendicitis, although the absence of any physical signs in the region of the appendix made it probable that there

was neither perforation nor localized peritonitis. The abdomen was opened over the usual seat of the appendix, a little higher than usual. The appendix was found to be normal. Through the upper part of the incision I explored with the finger the region of the gall-bladder, and found a tense, somewhat roughened adherent tumor, which I immediately recognized as a distended and inflamed gall-bladder. The incision was then carried upward into the region of the gall-bladder. The peritoneum was dark in color, greenish, but not necrotic, and there were easily separated adhesions on all sides. Gauze was packed all about the tumor, and it was aspirated. A considerable amount of fluid was removed. The gall-bladder was then opened, and from it were removed a number of large, irregular gallstones. A drainage-tube was placed in the gall-bladder with a small amount of gauze, and a little provisional packing was placed under the gall-bladder as in the other cases.

The patient made an uninterrupted recovery and remains well.

CASE IX.—Mrs. C. P., aged fifty-nine years, was seen March 5, 1897. This case of cholecystitis proved to be an infection by the typhoid bacillus. The history obtained from Dr. Chandler, of Townsend, the attending physician, was as follows:

Twelve days before my visit the patient had had an attack of acute cystitis. The spasmodic pains in the bladder were entirely relieved by treatment. The temperature was at all times elevated. With the last menstrual period there was a decided rise in temperature without increase in bladder symptoms. The general appearance was bad. Two days before my first visit she began to have pain with tenderness in the right iliac fossa. The temperature was 103.2°. The pain and tenderness were over McBurney's point, from which the pain radiated. There was some nausea. The temperature and pulse continued elevated. The pain was controlled by opium. On the day of my visit the temperature was 99.4°; pulse 80; the tenderness less. She had always been in very good health, and was of good constitution. During the past winter she had been complaining of the stomach. She had not looked as well as usual, but had lost no weight. Had never been jaundiced, and had had no attacks of pain. No history whatever of gallstones could be obtained. A tender tumor in the region of the gall-bladder or right kidney could be made out, but very indistinctly. The general condition was good, though the pulse was small and feeble. Operation was not advised. Three weeks later I saw her again. She had been having a good deal of pain and fever. The tumor had increased in size; it was elastic and fluctuating, exquisitely tender, and extended from the region of the gall-bladder into the back. A diagnosis of acutely inflamed and distended gall-bladder was made, with a possibility of its being a kidney.

Immediate operation was advised. The kidney was first explored by a small lumbar cut, and found normal. The gall-bladder was next exposed and found to be distended and inflamed. It was aspirated and then drained. A cylindrical stone, with smooth sides and rounded ends, was removed with great difficulty from the cystic duct. The gall-bladder was drained by means of tube and gauze. A good recovery followed. Examination of the culture showed the typhoid bacillus. This case was published by Dr. Mark Richardson in the *Boston Medical and Surgical Journal* of December 16, 1897. A careful review of the history in the light of the culture showed a strong probability that it

was a case of typhoid fever with a complicating cholecystitis. The case is here reported because the disease was watched, treated medically, and operated upon without the slightest suspicion of a typhoidal origin.

CASE X.—On November 3, 1897, Mrs. S., aged sixty-seven years, a patient of Dr. Gay, was taken with severe pain in the epigastrium extending toward the left. This attack had been preceded by a few days of uneasiness in the region of the stomach. The temperature was 102°. There were vomiting and distention.

The patient had been subject to "bilious" attacks, but had never been jaundiced. The present attack was supposed to be indigestion, and little was thought of it. The next day the pain was much more severe, and was localized in the region of the gall-bladder. There was constipation of gas and feces. There were general distention of the abdomen, tenderness over the gall-bladder, and dulness in the flanks. The diagnosis of acute cholecystitis was made. On the evening of the second day the temperature had fallen to 100°, the pulse to 90—the patient was decidedly better. Operation was therefore deferred.

On the following day the pain increased in severity; the pulse and temperature rose; the abdominal symptoms were more acute. Both Dr. Gay and myself concluded that interference was imperative, and I was asked to operate, Dr. Gay being called away unexpectedly.

An extremely distended gall-bladder was found, everywhere adherent by recent exudate. It was dark in color, and contained numerous calculi suspended in a dark, hemorrhagic, turbid fluid. The mucous membrane was dark gray and œdematous. The gall-bladder was drained with tube and gauze. Fully as many gallstones escaped through the tube as were extracted at the time of operation. The patient made a good recovery, and remains well. Cultures taken from the gall-bladder showed numerous bacteria of different kinds, which were supposed to be contaminations, so that no conclusions could be drawn as to the nature of the infection in this case.

THE CLINICAL SIGNIFICANCE OF REDUPLICATION OF THE HEART-SOUNDS.

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THE general fact that the two sounds of the heart may, either one or both, be heard as double sounds, is referred to in all works upon physical diagnosis. This incomplete summary of the opinions of different observers is only introduced to show that there is no settled belief as to the facts of reduplication, whether as to the frequency of the phenomenon, its clinical significance, or its conditions of occurrence. Eichhorst¹ states that reduplication of the heart-sounds is rare. According to Guttman,²

¹ Eichhorst. *Physikal. Untersuchungsmethoden*, 1889, vol. ii. p. 54.

² Guttman, *Handbook of Physical Diagnosis*. Translated by Napier, 1880, p. 210.

"Division of the first ventricular sound is relatively most frequent, the next most common phenomenon of this kind being doubling of the second arterial sound. Reduplication of the first ventricular sound occurs in perfectly healthy people, but is then never permanent."

Rosenstein¹ states that ventricular reduplication is rare. Osler² says "Gallop rhythm . . . usually results from the reduplication of the second sound in a rapidly acting heart. . . . Sometimes it seems as if the first sound was split; more commonly it is the second." Most authors mingle a theory of causation with the statement of the fact of reduplication. Thus, Bristowe³ writes, "Asynchronism in the action of the ventricles, indicated by reduplication of the sounds of the heart, is not infrequently observed. Occasionally it occurs in health, but much more commonly it is an accompaniment of disease. Reduplication of the first sound is chiefly met with in connection with hypertrophy of the heart and high arterial tension, especially, therefore, in chronic heart disease; and reduplication of the second sound is observed mainly in affections of the mitral valve." According to Fagge and Pye-Smith,⁴ "If the tension between the two great vessels of exit from the heart is very different in degree, the pulmonary valves may close before or after those of the aorta, and thus the second sound becomes reduplicated. Reduplication of the first sound at the apex undoubtedly occurs, but in a well-marked and unmistakable form is decidedly rare." Flint⁵ writes, "Reduplication of the heart-sounds denotes a variety of functional disorder giving rise, however, to no definite subjective symptoms, and occurring in various pathological conditions . . . a slight deviation from synchronism in contraction of the right and left ventricle accounts satisfactorily for the reduplication of both sounds, but not so satisfactorily for a reduplication limited to the second sound. The latter is best explained by supposing that, under certain conditions of arterial pressure, the recoil of the aorta and of the pulmonary artery after the ventricular systole is not in unison." From the physiological side Foster⁶ may be quoted, "In certain cases in which the semilunar valves on the two sides of the heart are not wholly synchronous in action, the sound of the heart here (at the second right costal cartilage) is double ('reduplicated second sound'), one being due to the aorta and one to the pulmonary artery." Some views are interesting chiefly as examples of the readiness with which explanations of clinical phenomena may be framed; thus, Barclay⁷ writes, "Reduplication, like intermission, sug-

¹ Rosenstein. Ziemssen's Cyclop. Pract. Med., vol. vi. p. 52.

² Osler. Practice of Medicine, 1892, p. 651.

³ Bristowe. Practice of Medicine, 1890, p. 516.

⁴ Fagge and Pye-Smith. Principles and Practice of Medicine, 1891, vol. II. p. 63.

⁵ Flint. Practice of Medicine, 1886, p. 353.

⁶ Foster. Text-book of Physiology, 1893, vol. I. p. 239.

⁷ Barclay. Manual of Medical Diagnosis, 1861, p. 292.

gests some imperfection in the relation of nervous force and muscular contraction. . . . Reduplication of the second sound is very often caused by imperfect closure of the auriculo-ventricular aperture on one side, which causes the systole of one ventricle to terminate more quickly than the other." Sahli¹ states, "A splitting of the first sound must depend on non-synchronous beginning, and of the second sound on non-synchronous ending of the systole of the two ventricles. The frequent explanation of the non-synchronous closure of the semilunar valves (as causing reduplication of the second sound) is undoubtedly wrong." Vierordt² shows the confusion arising from attempted comparison of physiological with pathological conditions. "Divided or double heart-sounds are ordinarily without significance if the condition otherwise is one of health. . . . Division of the second sound at the apex occurs in mitral stenosis. . . . We may especially refer a divided second sound at the apex, according to my experience, to mitral stenosis, in case there are, besides, undoubted signs of mitral insufficiency. Further, a divided second sound is heard in *pericarditis adhesiva* and systolic retraction of the apex beat." Sahli,³ on the other hand, is one of the few observers who correctly state that the triple rhythm heard at the apex in mitral stenosis is not caused by reduplication of the second sound. Walshc⁴ made an exhaustive study of this subject; but, as will be made clear later, he apparently confused real with pseudo-reduplication of the heart-sounds.

Gerhardt⁵ states truly that the phenomenon of division of the heart-sounds can be attributed to very different causes. He cites cases in which clinical examination disclosed reduplicate heart-sounds over limited areas, and in which, examined post mortem, there were found tendinous patches on the heart, confined to the areas of reduplication, whose friction had caused the phenomenon. Among the most important researches on this subject are those of Potain⁶ and of Geigel.⁷ Their original compositions have not been accessible to me. The former author found one or both heart-sounds to be doubled in one-fifth of all cases investigated, and usually it was the first sound that was split. He remarked that, in any case, the reduplication tended to rhythmically come and go with a period dependent on the rate of respiration. He observed that the doubling of the first sound was most marked at the end of expiration and beginning of inspiration, while the widest split-

¹ Sahli. Lehrb. d. klin. Untersuchungsmethoden, 1894, S. 221.

² Vierordt. Medical Diagnosis. Translated by Stuart, 1894, p. 219.

³ Sahli. Lehrb. d. klin. Untersuchungsmethoden, 1894, S. 221.

⁴ Walshc. Diseases of the Heart, 1862, pp. 73-76.

⁵ Gerhardt. Lehrb. d. Auscultation u. Percussion, 1890, S. 210

⁶ Potain. Note sur les dedoublements normaux des bruits du cœur. Union Médicale, 1866, vol. xxxi. (Quoted by Gerhardt.)

⁷ Geigel. Die gespaltene Herztöne. Memorabillen. Hellbr., 1863, vol. xiii. Verhandl. d. phys. med. Gesellsch. in Würzburg, 1869, vol. i (Gerhardt.)

ting of the second sound occurred at the end of inspiration and beginning of expiration. Of the divided first sound, the first half was heard more strongly over the left ventricle and the second half over the right ventricle. Of the divided second sound, the first half was heard more loudly in the aortic area, right of the sternum, and the second half over the pulmonary artery. The conclusion was, of course, that the contraction of the left ventricle and the closure of the aortic valves, in cases of reduplication, preceded the similar events on the right side of the heart. Geigel pointed out that changes in the ratio of pulmonary to aortic blood-pressure could alter the rate of arterial diastolic rebound so as to cause a perceptible interval between the closures of the two sets of semilunar valves. The opinion of W. H. Broadbent¹ has particular value: "Under certain conditions, chiefly when there is hypertrophy and dilatation of the left ventricle as a result of renal disease, or, on the other hand, when the right ventricle is overtaxed by resistance in the pulmonary circulation, the two ventricular sounds are not absolutely synchronous. When this is the case, the first sound as heard, either over the right ventricle or just outside the apex, is prolonged or murmurish, as it was termed by the late Dr. Sibson; but when the stethoscope is planted a little to the inner side of the apex the confused sound resolves itself into two distinct elements, and is found to be duplex or reduplicated. That is, the right and left sounds are heard separately, and the reasons why they are best so heard at the point mentioned is that here the stethoscope is over the septum, between the ventricles and upon a small part of each, so that it conveys the sound from both. . . . Reduplication of the second sound from precipitate or retarded closure of pulmonary or aortic semilunar valves disturbing the normal synchronism between the two is a frequent effect of mitral stenosis and of pericarditis, and it may be met with as a result of adherent pericardium and of other structural or valvular lesions. It is rarely produced by systemic resistance and high arterial tension, which give rise to reduplication of the first sound; more frequently by high tension in the pulmonary circulation due to disease of the lungs. It is, in effect, the pulmonary sound which is displaced, as is, perhaps, sufficiently shown by the fact that reduplication can be induced by simply holding the breath." In an able discussion of the subject, George Johnson² expresses still other views: "I now venture to suggest that the true explanation (of reduplication of the first sound) is to be found in the fact that the contraction of a dilated, and especially of an hypertrophied, auricle becomes sonorous, and that the first division of the double first sound in the cases under consideration (cases of Bright's disease) is the

¹ W. H. Broadbent. *On Some Points in Relation to the Sounds of the Heart*. Practitioner, vol. xxx. p. 1.

² George Johnson. *Lancet*, 1876, vol. i. p. 699.

result of the auricular systole. . . . Dr. Hayden, in his recently published and valuable work on *Diseases of the Heart and Aorta*, expresses the opinion that reduplication of the first sound 'is due to resolution of the first sound into its two normal elements, namely, the cardiac impulse and the sudden tension of the auriculo-ventricular valves. . . . Cardiac impulse coincides with the initial portion of the ventricular systole, while tension of the auriculo-ventricular valves and attached *chordæ tendineæ* occurs at the conclusion or acme of the systole.'” Hayden,¹ drawing his conclusions from a carefully studied case in which there was aortic stenosis, together with both mitral stenosis and incompetency, and in which doubling of the second sound was very marked, held that the first element of the reduplicated second sound was caused by closure of the semilunar valves; but that the second element depended upon the sudden tension of the mitral curtains by reflux of the sharp current sent through the centre of the ventricle by the resilience of the hypertrophied auricle, and which passes back along the walls under the valves. If this valve-tension occur late in diastole it would simulate doubling of the first sound. Barr² explained reduplication as the physiological result of the rhythmic over-filling of the right ventricle which, he says, normally occurs at the end of expiration and beginning of inspiration. The right ventricle is thus stimulated to contract before the left, the result being a doubling of the first sound. As pulmonary capacity increases with inspiration, the resistance to contraction of the right ventricle is decreased, its systole is abbreviated, and the closure of the pulmonic valves is hastened. Barr thus supposes the conditions leading to reduplication to be initiated in the right ventricle, while most authors ascribe this phenomenon to occurrences in the left ventricle. Finally, Sansom³ has elaborately reviewed the whole subject. It is a great merit on the part of this author to have distinguished *real* from *simulated* reduplication of the heart-sounds. He says, in part: “What seems a doubling of either of the sounds is really a complex phenomenon dependent on various causes. The sounds which so closely resemble, or may be to the ear absolutely indistinguishable from, doublings of the sounds, are not necessarily repetitions of the systole of the ventricles, or of the reflux against the semilunar valves, but may be due to many causes, and may occupy other portions of the cardiac cycle than those which have just been indicated.” Sansom concludes from his studies that the so-called reduplication of the first sound of the heart is not due to want of synchronism in the action of the two ventricles, but to audible, presystolic vibration of the mitral valve which is produced by the sudden tension

¹ Hayden. (Quoted by Sansom, p. 216.)

² Barr. *Medical Times and Gazette*, 1877, vol. i.

³ Sansom. *Diagnosis of Diseases of the Heart and Thoracic Aorta*, 1892, p. 207.

imparted to it by reflux of the current shot into the ventricle by the contraction of the (usually hypertrophied) auricle. The first element of the double sound is, then, presystolic and valvular. The same explanation is offered for reduplication of the second sound, except that the mitral valve tension is produced early in diastole, just following semilunar closure, by the reflux of a current sent into the ventricle by the elastic resilience of an over-stretched auricle. These views differ from those previously announced by Hayden, inasmuch as, according to this author, it is the *second* element of the double first sound which is valvular in origin.

It must now be clear that there is little harmony in the various interpretations of the phenomena of reduplication of the sounds of the heart. The scientific character of those who have already investigated this subject is sufficient evidence of its importance, and the unsatisfactory condition of our present knowledge is reason enough why further effort should be made to explain our clinical facts.

(To be continued.)

HÆMATOMYELIA FROM GUNSHOT WOUNDS OF THE SPINE.

A REPORT OF TWO CASES, WITH RECOVERY FOLLOWING SYMPTOMS
OF HEMILESION OF THE CORD.

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GUNSHOT injuries of the spinal column are of comparative rarity. The mortality of cases with symptoms of cord lesion, especially in the cervical region and without operative interference, reaches a high percentage.¹

In those cases which recover, the nature of the lesion is often difficult of determination, the disturbances of motility and sensibility giving clue alone to the spinal segments involved and the transverse extent of the injury, but not to its pathological anatomy.

In each of the following cases the missile lodged in the centrum of a vertebra without direct injury to the cord; but, nevertheless, produced symptoms of hemileSION. A study of their symptomatology, with a discussion of the character of the lesion, is contained in this communication.

¹ In the American Civil War 642 cases of gunshot wound of the spine of all varieties were reported, with a fatality of 55 per cent. The cervical cases alone reached 70 per cent. Chi-pault (*Etudes de Chirurgie Médullaire*. Paris, 1891) has collected 101 cases from 1850 to 1891, with operation and recovery in 60 per cent. The mortality without operative interference reaches 80 per cent., and life, for the 20 per cent. surviving, was hardly worth the living. The consensus of opinion (cf. Vincent, *Revue de Chirurg.*, 1892) recommends operation unless there is total transverse lesion indicated by abolition of knee-jerks.

Both cases illustrate some unusual features of a type of the so-called Brown-Séquard paralysis; the value of the x-rays in locating the offending bullet; practical recovery without operative interference; a residuum of symptoms resembling syringomyelia.

CASE I.—The patient, a young woman, aged twenty-seven years, was brought into Prof. Halsted's service at the Johns Hopkins Hospital, November 6, 1896, with a history of having been shot a few hours before entrance. Her assailant was standing on her right side a few feet from her. Two shots were fired. She was sitting at the time, and fell forward on to a table, bleeding from the mouth; a plate of upper teeth, which she was wearing, was driven out by the bullet. At the second shot she fell to the floor, and it seemed to her that her limbs had become stiff, and there was a sensation in the right calf as though it were swelling up and would burst. In a few moments her arms began to tingle, so that they could not be touched. She lost consciousness at no time; there was no vomiting. At entrance, examination revealed three bullet wounds; two small characteristic wounds of entrance with a tattooing of powder grains about them, and the third a ragged wound through the soft palate. (This, with the upper of the entrance wounds, situated just above and anterior to the right tragus, we may dismiss with a word; both healed rapidly; there was a resulting otitis media, doubtless from tubal infection due to the suppurating wound in the mouth.) The other entrance wound was situated on the right side of the neck at the anterior border of the trapezius on a level with the cricoid cartilage. About this our chief interest centres.

From the notes taken six hours after the injury. "The patient lies prostrate; head turned to the left; arms not drawn up; respiration completely diaphragmatic; no dyspnoea; temperature 98.6°; pulse 60. She is groaning from "pain," especially severe in the arms. The sensation is that of their 'being asleep'; a 'pins-and-needles' feeling, but of an exaggerated and agonizing character. This same sensation is present in the right leg, and to a less degree over the abdomen and down the left leg. It is intensified by the slightest touch or by the pressure of the bedclothes, and is so severe that she cries out. It seems to be more or less paroxysmal and associated with slight muscular contractures. The pupils are equal, contracted, and react to light; the right palpebral fissure seems smaller, but this may be due to the slight swelling of that side of the face. Tongue protrudes in the median line. A marked tremor of the lips in speaking. No oral, visual, or cerebral disturbances made out.

Motor symptoms: "There is a right-sided hemiplegia below the level of the deltoid, biceps, and supinator longus muscles. There is some power, therefore, in flexion and abduction of the arm, but only with the greatest effort. She says, 'It is heavy,' and the attempt apparently exhausts her. The arm tends to remain in the slightly flexed and abducted position which it has reached. The left leg she is able to move in every direction, but only with the same fatiguing effort. In the left arm a condition is present similar to, but less pronounced than, that in the right. Flexion, abduction, and outward rotation are possible; slight motion is possible in the fingers in flexion. No extension. All motion accompanied by the same feeling of heaviness and fatigue."

Sensory symptoms: "Analgesia, apparently complete, is present in the left leg. A pin-prick is recognized as a touch; a pinch, as pressure. There is hyper-sensitiveness to impressions of pain in the arms. Tactile sense, on superficial examination, seems everywhere normal, though touching or moving the limbs makes her cry out, and the examination was unsatisfactory, as was also the attempt to determine the presence of muscle-sense. It seemed present on both sides. Thermic sensibility uncertain on the left side, and apparently absent in the right hand.

"Reflexes (six hours after injury): Both knee-jerks are present, the right much less active. No superficial reflexes obtained.

"There exists a marked disparity of temperature on the two sides of the body; so much so that even the nurse's attention was attracted by the great surface heat on the right side, especially noticeable in the upper extremity. The patient has voided no urine."

Twenty-four hours after entrance. "The patient passed a wretched night, crying out with the pain in her arms; little relief from morphia; pyrexia of 102° by midnight (ten hours after injury); no disparity of surface temperature on two sides of body was appreciated this morning. She is unable to recognize the position of the right leg. There seems to be a reduced tactile sensibility in the left lower leg and over the right thigh and foot; patient says, 'they feel dead.' Sphincter ani relaxed; after an enema the rectal contents have dribbled away. Urine passed involuntarily during the night. It seems that she appreciates when her bladder is emptying. Urine negative but for abundant uratic deposit."

From notes on the third day. "There is less complaint of 'pain' in the arms. Considerable pain is elicited in the neck and down the arms when the head is moved; no spontaneous spinal pain; slight tenderness on pressure over the vertebra prominens; head still held to the left; respiration continues purely diaphragmatic; with forced inspiration accessory muscles brought into play; incontinence of urine and feces, though patient conscious of the act.

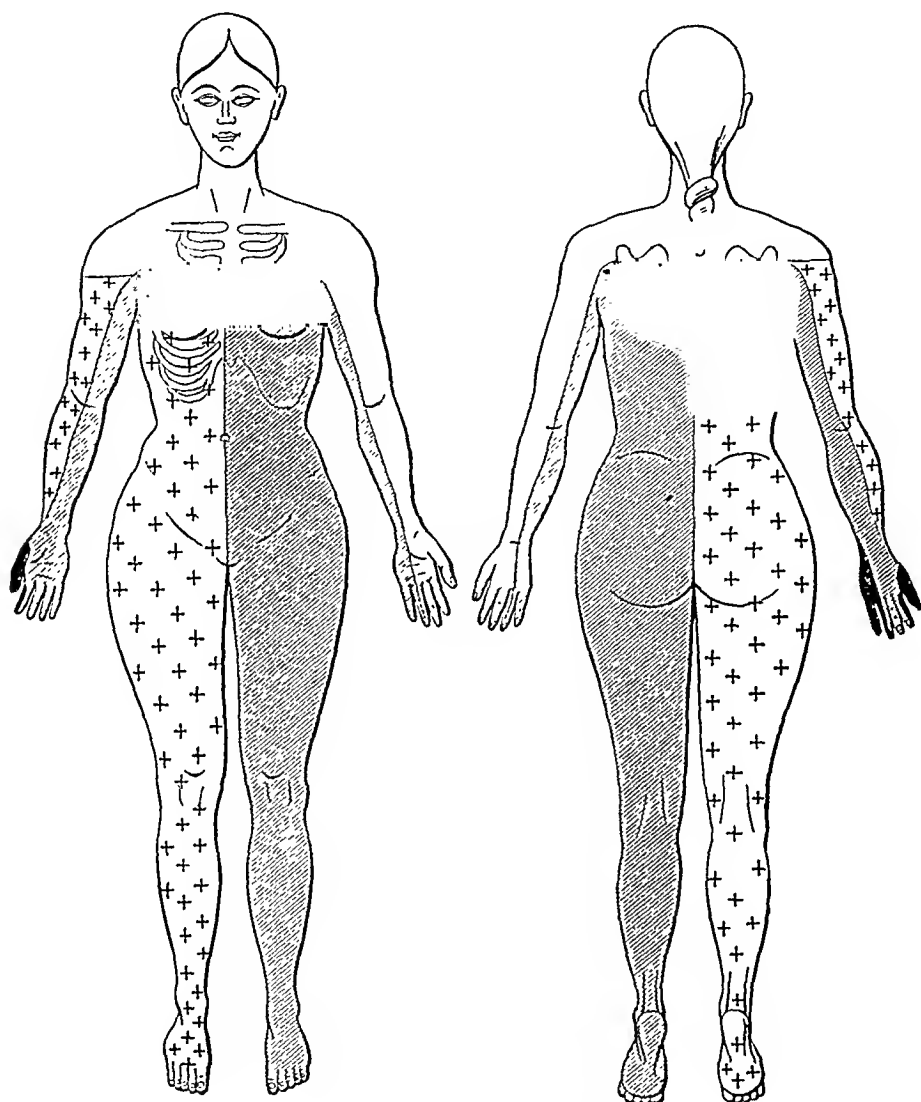
"Motor paralysis in left arm has largely disappeared; all motions possible; chief weakness in extensors of elbow and wrist and intrinsic hand muscles. Paralysis on the right as at entrance, and extends complete to level of fifth root group. There is distinct weakness of muscles in this group, namely, of deltoid, biceps, supinator longus, clavicular portion of pectoral. They contract only on great effort, causing an exacerbation of the 'pins-and-needles' feeling in the arm. This paresis may extend higher, accounting for the position of the head; not certified. The knee-jerk on the left is exaggerated, with suggestion of patellar clonus.

"More careful note of sensory disturbances reveals on the right (Fig. 1)—the side of motor paralysis—a zone of analgesia from the second to the fifth interspace in front; from the spine of the scapula to the costal margin behind and including the right hand, and all of the arm but the outer side as far down as the wrist, where was marked hyperæsthesia. (Thermal anæsthesia was probably complete over this zone, though no tests were made. Brushing the actual cautery, at a dull heat, over the back twenty-four hours later gave no sensation of temperature or pain below the level of the scapular spine.) Over the thumb and border of the index finger, and approximately over the ulnar dorsal cutaneous area, there is absence of tactile sensibility.' On the left side analgesia

¹ Accurate observations in the hand were very difficult. It seemed that after the hyperæsthetic areas had been stimulated, from attempts to determine their boundary, she would interpret touch as pain, over fields apparently analgetic to previous stimuli.

was practically complete from the same level on the trunk over the whole side, though from the fifth intercostal space to the iliac crest there seemed

FIG. 1.



Sensory disturbances on admission.



Anaesthesia to Pain and Temperature.



Hyperaesthesia.



*Total Anaesthesia.**

to be some pain points. In the arm there is a narrow strip of analgesia from the axilla along the ulnar border, including the little and ring-fingers."

* Sensibility to tactile stimuli may not have been completely absent over the whole body zone.

For the sake of clearness in following the different groups of symptoms through the subsequent history, it seems advisable to take them up and discuss them individually rather than to leave them grouped, as in the daily notes.

A word as to the general progress. There had been pyrexia of 2° following the night of admission. Forty eight hours after the reception of the injury a chill, with further elevation of temperature to 104° and 105° , ushered in an attack of pneumonia, with a large patch of basal consolidation on the side of the lesion. This is apparently a not uncommon occurrence in cases of cervical lesions, though one finds no special mention of its importance. It possibly bears some relation to the intercostal paralysis. This, for the time being, set aside all thought of operative interference. Distinct signs of consolidation remained in the chest for ten days. There was a gradual subsidence of pyrexia, which took twenty-eight days to reach a normal level.

For the month following this pneumonia there was rapid motor improvement and gradual disappearance of the annoying subjective symptoms. She was up and beginning to walk quite well. The succeeding month was one of discouragement, return of pains in the arm, difficult spastic progression, and various unpleasant symptoms to be described. This again was followed by a slow improvement to her present excellent condition six months after the injury.

Subjective symptoms. It is difficult to describe the patient's sensations. As Gowers says, "Our sensations transcend our vocabulary." She said it seemed as though her arms were "badly asleep," which may come under the category of "pins-and-needles" sensations or of numbness and tingling. The subjective impression was one of pain. For the first few days it was distressing to see her. These sensations were present, persisting in the left arm for a day or so, to give place to one of itching, then to one of burning, and finally to radiating pains which were the precursors of the return of motor power, and the exodus of all subjective symptoms, except for some stiffness and numbness in the finger-tips.

This same cycle was subsequently observed in the right arm: (1) agonizing numbness and tingling, subsiding by the fourth day; (2) pruritus so severe that on the fifth day she said, "I could tear it to pieces;" (3) burning sensations complained of in the second week, and, finally, (4) lancinating pains. The patient recognized this sequence, and said that she ought to move her fingers soon, which she did on the twenty-eighth day.

Four days after the injury complaint was first made of a belt sensation, which was located about at the costal margin: "I get so tight across my stomach, I think I will burst," she frequently remarked. There was no meteorism at this time. "Girdle pain" Gowers considers of much practical importance, as it evidences the existence of inflammatory and degenerative processes, and indicates a level at the upper border of an injury when transverse. Here it was certainly below the area which corresponded to the lesion. Perhaps in partial lesions it may appear at the lower level, a view which several of Thorburn's cases would uphold.

At the end of the second month, during the period of non-improvement above mentioned, there was a return of this girdle sensation, and, curiously enough, the constriction seemed to her much tighter on the

right, the paralyzed side, than on the other. It corresponded to a belt of hyperæsthesia to be described. Other disagreeable sensory disturbances appeared at this time. There was great complaint of cold feet; they felt icy to the touch and the usual measures failed to give relief. The anæsthetic leg was slightly burned several times by attempts to warm it. The spastic condition of the right leg was at this time in greatest evidence. She had a sensation of stiffening and becoming rigid when she first attempted to walk, or to turn in bed after being quiet for awhile. "I feel stretchy," she would say. "Cutting" pains appeared in the right arm, intensified with the least handling, and located about the upper arm, and in the flexor tendons of the wrist; her nights were almost sleepless. Extreme hyperæsthesia of the lower arm, as at the side of the trunk girdle, reappeared, and only very gradually wore away, lingering in the ulnar half of the arm for a couple of months, where a trace of it still remains.

The reflexes. At the first examination the deep reflexes were present, moderately active in the left leg, much less so on the right, the side of paralysis.

Forty-eight hours later myotatic contractions on the left were much exaggerated with a distinct quadriceps clonus; reflexes on the right feeble.

At the end of four days the right knee-jerk could not be obtained, and the left was much less active. This condition held for three days, when there was a gradual reappearance of reflexes, becoming more and more active, especially on the side of the motor paralysis and concomitant with its disappearance.

[Of this sequence of reflex activity there seems to be no special mention in the bibliography. The persistent abolition of reflexes in total transverse lesions in man, first noted by Bastian,¹ and recently emphasized by various authors,² is now well recognized. In partial lesions with degeneration of the pyramidal tract, early suspension and subsequent increase in a few hours or days is supposed to be the rule, and in hæmilesion on the side of injury alone. An early enfeeblement, subsequent loss, and final return with exaggeration, as in our case, were noted by Kocher³ in his remarkable case of hæmilesion from stab high in the cervical cord. The weakened reflexes had disappeared by the seventh day, to return on the eleventh, and by the fourteenth were greatly exaggerated, the knee-jerk on the opposite side remaining constantly normal. Similarly, in one of Thorburn's⁴ cases, cursory note is made of it, and Ferrier,⁵ in a case of transverse lesion in the ape, noticed this temporary obliteration of the reflex phenomena coming on some days after the injury. This sequence in partial lesion may be of more common occurrence than has been noted.]

¹ H. Ch. Bastian: "On the Symptomatology of Total Transverse Lesions of the Spinal Cord, with Special Reference to the Condition of the Various Reflexes." *Med. Chir. Trans., Lond.*, 1890, lxxiii. p. 151.

² E. S. Reynolds: "The Condition of the Reflexes in Total Transverse Division of the Spinal Cord." *Brain*, 1895, xviii. p. 148.

H. W. Page: "Three Cases of Fracture-dislocation of the Spine with Total Transverse Lesion of the Spinal Cord." *Lancet*, London, February 8, 1896, p. 339.

³ Theo. Kocher: "Die Verletzungen d. Wirbelsäule zugleich als Beitrag z. Physiolog. d. menschlichen Rückenmarks." *Mitteilung. a. d. Grenzgebiet. d. Med. und Chir.*, 1896, Bd. I., S. 415.

⁴ Wm. Thorburn: "A Contribution to the Surgery of the Spinal Cord." Case xv., p. 45.

⁵ D. Ferrier: "Recent Work on the Cerebellum and its Relations." *Brain*, 1894, xvii. p. 14.

Following their reappearance, the deep reflexes become progressively more active. By the sixteenth day an ankle-clonus was obtained, which soon became so marked that a slight pressure on the plantar surface occasioned it, and similarly a clonic contraction of the quadriceps by simply touching the upper border of the patella.

At this time a triceps and supinator reflex and myotatic contractions also of the flexor and extensor group of the right arm were readily obtained by light tendon rappings. Up to the present time, though to a less degree, these deep reflexes on the side of the former paralysis remain exaggerated. The extreme activity wore away in a few months.

A return of the abolished superficial reflexes was not observed until the end of the second month.

There was an early involvement of the reflex acts of defecation and micturition. After the first forty-eight hours of lack of control, obstinate constipation ensued, and only very recently has the patient found enemata unnecessary for an evacuation of the bowels. During the first few weeks there was considerable meteorism, and peristaltic movements were evident through the abdominal wall. The urine was passed without control for a few days, but she soon could appreciate when her bladder was full, and would call attention to it. Some dribbling persisted for a month or two. There was no complicating cystitis. The menstrual period, which, before the injury, had occurred every two or three weeks, showed itself as a slight discharge on the second day after the injury, and not again for nine weeks. Catamenia since then have been normal.

During this whole period there was constant evidence of vasomotor disturbance; the right hand was often noted as being very warm, and the patient complained of flushes in it. There was a very perceptible increase of the secretion of sweat on the right side, which frequently would drip from the axilla when the arm was bared for examination. This hyperidrosis is still present. There was marked hyperæmia following a pin prick also on that side.

Motor disturbances. As stated in the early clinical note, the motor paralysis on the left side was a transitory one, all motions being possible in the arm after a few days, and the resulting paresis, though lingering for a few weeks chiefly in the extensor group and intrinsic hand muscles, by the second month had entirely disappeared. At present there is complete restoration.

The right hemiplegia was somewhat less early in its subsidence. Following the return, and with the exaggeration of the deep reflexes, motion was first observed on the tenth day as a slight contraction of the quadriceps, and by the throwing into prominence of the extensor tendon of the great toe when a futile attempt was made to raise the foot. Motion then rapidly returned and in four days was possible in all directions. Muscular power was soon largely regained everywhere except in the dorsal flexors of the foot.

[This seems to be the customary period before return of motion after degeneration of the pyramidal tract, the quadriceps muscle usually giving first evidence of it. In Kocher's case of hemileSION, above cited, it was seven days. In the light of Turner's interesting experiments on hemileSION,¹ it would seem to indicate the time necessary for

¹ Turner: "On Hemisection of the Spinal Cord." *Brain*, 1891, xiv. p. 496.

deussating motor neurones from the opposite half of the cord to assume the function of those on the injured side.]

The *nutrition* of the patient at this time had begun to suffer greatly, though a fair amount of nourishment seemed to be taken. In a note on the twenty-second day after injury: "Muscular wasting and improvement in muscle power seem to be in inverse proportion. The patient is becoming quite emaciated; breasts are atrophied; ribs prominent; tissues, especially in paralyzed leg, are flabby, with atrophy most marked in the calf. Electrical reaction shows no loss of irritability to faradic current."

Of a series of measurements taken, this change is shown most strikingly in the right calf, with culmination of atrophy in the third week after return of motion:

	Right.	Left.	
10th day,	32 cm.	32 cm.	Paralysis of right leg; return of reflexes.
16th "	31 "	31½ "	Motion returning; exaggerated reflexes.
23d "	29¾ "	31 "	Motion possible in all directions.
30th ¹ "	29¾ "	31½ "	Motor strength increasing.
37th "	30¾ "	32½ "	Sitting up; massage.
59th "	31½ "	33 "	Walking; spastic gait.
75th "	32¾ "	34 "	Gaining weight.
198th "	33½ "	35½ "	Present condition.

On the thirtieth day motion was possible in the abdominal muscles, and soon after it appeared feebly in the intercostals. At this time she was encouraged to get up, and soon after was able to take a few steps, though she was very unsteady and required support. The weakness of the dorsal flexors of the foot on the paralyzed side became very evident; she could not lift the foot from the floor, but dragged it along in a typical late hemiplegic fashion.

[To this resultant leg paresis, invariably selecting a certain muscle-group, Ludwig Mann² has recently called special attention. That its character was constant, independent of the level of lesion of pyramidal tract fibres, from the cerebral cortex to lumbar enlargement, was brought out by Wernicke.³ Mann has demonstrated that it confines itself to a certain co-ordinate muscle unit (*Bewegungseinheit*) which has a definite function. Restitution of muscle power, though otherwise complete after pyramidal tract degeneration, invariably selects those muscles which he calls the "shorteners" (*Verkürzer*), namely, the dorsal flexors of the foot and the flexors of the leg, whose combined muscle action is that of lifting the leg in the second stage of walking, when the foot is raised from the ground. This residuary paralysis is responsible for the peculiar gait described as hemiplegic. A considerable weakness of the dorsal flexors of the foot remains in our patient to this day. Other muscles of this unit Mann has shown to be the iliopsoas, the tensor fasciæ latæ, the gracilis, and the sartorius. Paresis of the two

¹ The patient's weight had dropped at this time from 138½ to 116 pounds.

² Mann: "Klinische und anatomische Beiträge zur Lehre von der spinalen Hemiplegie." *Deut. Zeit. f. Nervenheilkunde*, 1896, Bd. x. Hft. 1, 2, pp. 1-66.

³ C. Wernicke: "Zur Kenntniss der cerebralen Hemiplegie." *Berliner klin. Woch.*, 1889, Bd. xxvi. No. 45, S. 969.

latter, as flexors of the leg, is readily demonstrated when the patient lies on her face and the leg is hyper-extended by placing the hand under the knee so as to relax the hamstring muscles. While in this position the power of flexion of the leg is very evidently weak in our patient. The hamstring muscles themselves, though flexors ordinarily, in the act of walking are extensors and belong to the muscle group of the first stage of walking, the lengtheners.]

On the twenty-seventh day, after the period of lancinating pains and increased reflexes, was first observed the faintest trace of motion in extension of the right index-finger (twenty-two days in Koehler's case of hemileision, above cited). Return of motion was soon evident in the extensors of all the fingers, in the triceps, the costal part of the pectoralis major, in extension of the wrist, flexion of the wrist, flexion of the index and middle fingers and thumb, such as would be expected with the gradual return of function in the spinal segments from above downward, no reaction of degeneration having been obtained in any of the paralyzed muscles. Reaction followed this rapid improvement, and during the aforementioned third month motor change was at a standstill. Progression, which up to this time had steadily bettered itself, became less easy, the gait more spastic, clonic muscular contractions starting up when she bore any weight on the foot. This period was signalized by the above-described subjective disturbances and by the appearance of trophic changes in the right hand. The hand became much swollen, the skin shiny and tense, obliterating all furrows, the fingers very stiff, painful, and distinctly tapering, the nails convex and painful when touched. Across the nails had grown out slightly elevated whitish transverse ridges. These measured about 4 mm. in width on the right finger-nails. Similar ridges, though much less broad, were present on the nails of the little and ring finger of the left hand, corresponding to the transitory disturbance there. Pains of a cutting character appeared with numbness, flushes, and all so distressing that passive movement was precluded for a few succeeding weeks until these disturbances began to wear away. Since then there has been an uninterrupted improvement in muscle power.

[These nutritional disturbances, as J. K. Mitchell¹ points out, may occur at any time, and do not belong to cases of complete destruction, but are met with only when there is partial injury. He says, further, that they usually appear when the wound is healing, and their duration varies from weeks to permanence. He holds to the view that it is a loss of trophic control rather than an abolition of trophic function.]

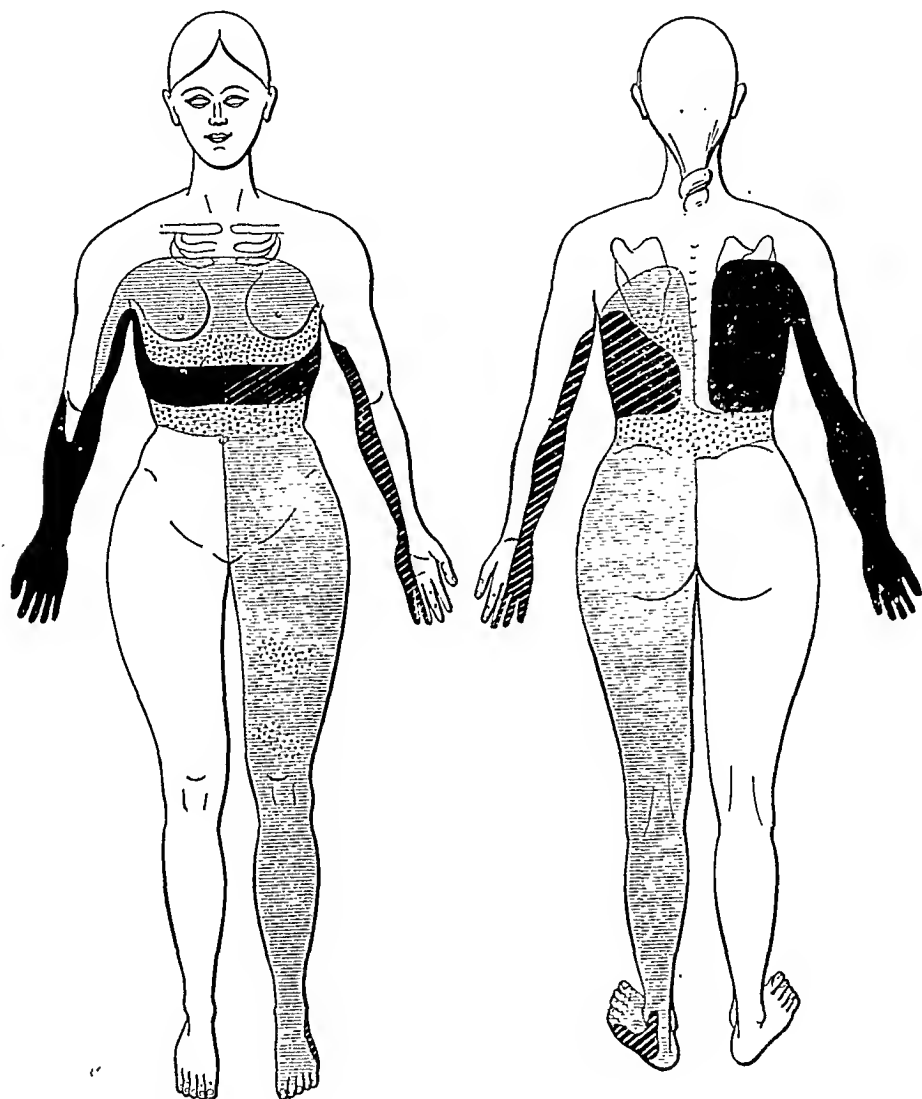
At the present writing there persists inability to completely close the hand, especially the little and ring fingers; inability to oppose the thumb and little finger; marked atrophy of the abductor indicis.

Sensory symptoms.—The analgesia described as present on entrance over the left side below the second intercostal space and down the inner side of the arm, as well as over the right chest and arm, had been gradually disappearing, and in the right arm had been replaced by extreme sensitiveness to painful stimuli. By the second week a pin prick was recognized as such, though she said "it does not feel sharp." A pinch was no longer mere pressure. Some hyperalgesia still persisted on the right lower extremity, but in greatly lessened degree. Tactile sensibility had also largely returned over the areas of total anesthesia.





¹ J. K. Mitchell: Remote Consequences of Injuries of Nerves. Philadelphia, 1896.

During the above-mentioned period of retarded improvement more careful observation of the sensory disturbances revealed an interesting

FIG. 2.



Thermic disturbances (second month).

- | | | |
|---|--|----------------------|
|  | Areas of extreme "Cold Pain." | } Thermo-anaesthesia |
|  | "Cold Pain" less extreme. | |
|  | Cold as warmth with some pain. | |
|  | Cold interpreted as warmth. No thermic response to Heat. | |

condition which makes it a matter of regret that the sensibility to thermic impressions had not been more carefully noted in the interim. After the first note of uncertain perception of temperature on the left

side and its absence in the right hand, but few observations were made. At the time of the pucumonia (four days) it was noticed that brushing the Paquelin cautery over the right back gave no sensation below the level of the spine of the scapula. This corresponded to the analgetic zone. Subsequently (sixty days) the hot water cans, applied to her cold feet, gave no sensation of warmth, and burned the left leg in several places. This led to more careful examination, with the following result. (Fig. 2.)

In general, sensation to cold (tested with a camel's-hair brush moistened with ether) was lost from the second interspace over the whole left side of the body. It was recognized as warmth to a zone (see Fig. 2) about 10 cm. wide, beginning at the level of the seventh rib in the mammary line, where it was interpreted simply as pain, a "pins-and-needles" sensation closely akin to the early spontaneous ones, so severe that she would draw away and almost cry out. The boundaries of this zone were very definite. Above and below it were border-zones over which she would say "it is beginning to pain, but still feels warm." Over the whole leg below cold was recognized as warmth, but there were isolated areas with ill-defined boundaries over which it gave a slight sensation of pain. On the right front at the same level a similar condition existed; the pain, however, being distinctly more severe than on the left. Over the back this zone, where cold produced pain, was more widespread, especially on the right side, extending practically over the old areas of analgesia from the spine of the scapula. Curiously enough, the areas did not seem to meet at the median line behind. It included the whole right arm except the outer surface of the upper arm and slightly below the elbow, which is practically the sensory distribution up to the fifth root, as we shall see, the upper limit of lesion. The sensation of pain was especially intense in the fingers and hand. For convenience and from its chief characteristic, we have called this area across the body and arms the "cold-pain" zone. A gap of normal sensibility existed between the thoracic zone and the area of the left arm, which extended from below the axilla along the inner side, including the little and ring fingers. (This represents the first dorsal root distribution and probably the level of injury to the left half of the cord.) A small distinct area where cold produced pain was also demonstrated under the left external malleolus and outer border of the foot.

Heat (tested by tube of warm water) on the left side of the body conveyed no temperature sensation whatever, and was simply recognized as touch. Over the "cold-pain" areas of the chest and arm, however, when near the boiling-point it gave a slightly painful sensation (without thermic impression) of the same kind as the pain from cold. On the right its perception was normal everywhere, except over the "cold-pain" body zone and in the arm, where pain was associated, and, as with the stimuli of cold, more marked than on the left. (We must bear in mind the slight hyperalgesia of the right and the fading analgesia on the left at this time. The mere pressure of a tube at body temperature on the right gave the same sensation of pain, though less marked than the hot tube.) Over the old zone of anæsthesia from the second space to the "cold-pain" areas, heat perception was present, but dulled.

Tactile impressions (tested with a wisp of cotton) were distinctly blunted over the whole left side, chiefly just below the second interspace, down the inner side of the arm and under the left outer malleolus, where they

were about absent. On the right persisted also the diminished tactile sense below the second space. Over the "cold-pain" areas of the trunk and right arm a sensation of pain, of "pins and needles," was elicited with the gentlest tactile stimulus, and it was believed that there was a complete abolition of tactile sense. That this was not the case, however, was demonstrated by Dr. Barker by means of von Frey's æsthesiometer, with which a distinct sensation of touch without pain could be called forth with the pressure of a fine hair, though the threshold for pain was so low that a deeper pressure of the same hair would produce a sensation of pain.

[Two interpretations may be given to the above-mentioned sensory phenomena, depending upon the presence or absence of special nerves for pain. One rests upon the possibility of a transmission of painful impressions by sensory nerves other than those whose special function it may be to convey sensations of pain. This interpretation of Goldscheider and others is most generally accepted. Gowers,¹ for instance, speaks of the sensation of "pins and needles" which all stimuli called forth in our case and which the patient called "pain," as "representing the highest degree of excess of impressions conveyed by the nerves of tactile sensibility." Granting this view, we must consider that over the "cold-pain" areas on the right all forms of stimuli produce pain from the irritability of their respective conducting paths, namely, for touch, pressure, or thermic impressions. On the opposite side there is practically an interruption of heat conduction with a diminished irritability of tactile and pain tracts, the cold paths alone being extremely irritable and ready to call forth pain. The fact that pain from cold stimuli is about equal on the two sides, remembering that partial analgesia existed on one, with hyperæsthesia to pressure pain on the other, would favor this view as opposed to the second less commonly accepted interpretation, namely, that sensations of pain can be transmitted only by the special nerves set apart for that purpose and not at all by nerves subserving tactile and thermic sensations. This latter view is championed by von Frey,² who, with others,³ has brought forward most convincing arguments in its support. It is interesting here to note in its favor that the character of pain produced by all manner of stimuli was alike, and the same as the spontaneous pain while that lasted, namely, a "pins-and-needles" sensation. The only spontaneous pain at the present time is located in the right arm and described as "darting." This is the sort of pain which cold provokes now. Also while the "pins-and-needles" feeling was present the patient at one time volunteered the remark that the ether and brush felt just like the pin prick, but that there were myriads of points. Most of the thermic and other sensory disturbances could be explained under either interpretation. No attempt was made to isolate individual pressure, thermic, and pain points.

The subject involves, of course, the discrimination between specific nerve fibres for the various modalities of sensation, not only in the

¹ Gowers: *Diseases of the Nervous System*, 1893, p. 219.

² v. Frey, M.: *Untersuchungen ueber die Sinnesfunctionen der menschlichen Haut*. *Berichte der math.-phys. Cl. der K. Ges. d. Wiss.* 2 Juli, 1894, 3 Dec. 1894, and 4 März, 1895; also, *Druckempfindung und Schmerz*. *Abhandl. der math.-phys. Cl. der K. Sächs. Ges. der Wiss.*, Leipzig, 1896, Bd. xxiii. No. iii.

³ L. F. Barker: "A Case of Circumscribed Unilateral and Ecliptic Sensory Paralysis." *Journal of Experimental Medicine*, 1896, i., No. 2.

peripheral nerves, but also in their indirect intramedullary continuations (sensory neurones of the second and of higher orders), but the topic is at present too unsettled to justify further discussion in this place.]

To summarize, there existed on the left, beside a general slightly sub-normal sensibility to pain and tactile impressions, perverted recognition of thermic stimuli to cold and absence of recognition of warmth. In addition, over the area for convenience called the "cold-pain" zone, cold produced no sensation other than pain even when near body temperature. Heat similarly produced no thermic impression, but called forth pain only at high temperatures. On the other hand, on the right side, with the exception of slight hyperæsthesia to pain, sensations were practically normal below this "cold-pain" zone. Over it, however, existed extreme hyperæsthesia to pressure and pain. Cold produced pain alone without thermic impressions, and more severe than on the left; heat gave a normal sensation with the additional factor of pain, slightly more marked than that produced by mere contact. These observations would seem to indicate a dissociation of heat and cold paths in the cord as well as the more often noted dissociation of the combined thermic and the pain tracts.

These sensory disturbances for ease of comparison are here tabulated:

I Over those areas spoken of as the "cold pain" zone (Fig. 2, black).

Right.	Left.
<i>Pressure or touch</i> : Present and unimpaired. (?) Low threshold for pain makes its recognition difficult.	Present, slightly dulled.
<i>Pain</i> : Greatly exaggerated.	Slightly dulled.
<i>Cold</i> : Recognized as severe pain without thermic impression.	Recognized as pain without thermic impression, but less acute than right side.
<i>Heat</i> : Recognized as pain which is slightly greater than that produced by mere pressure. ¹	No thermic impression whatever; pain when near boiling-point.

II. Elsewhere over the body below this level.

Right.	Left.
<i>Pressure and touch</i> : Unimpaired.	Slightly dulled.
<i>Pain</i> : Slight hyperæsthesia.	Slight anæsthesia.
<i>Cold</i> : Normal thermic sensibility.	Recognized as warmth ² (some pain).
<i>Heat</i> : Normal thermic sensibility.	Absence of thermic sense.

A month later (ninety-two days) the intensity of these sensory disturbances had abated. The extreme hyperæsthesia had diminished over the "cold-pain" zone on the right. Pressure over circumscribed areas with test-hairs showed that the threshold for pain above noted had

¹ We should have been able, possibly, on this side, had the tests been conducted with greater precision, to produce pure thermic impressions without accompanying pain, by delicate warm stimuli, as with the pressure-points, which were shown to be capable of stimulation without eliciting pain.

² This need not necessarily be interpreted as a paradoxical temperature-reaction, inasmuch as relatively mild irritation of pain-nerves may give rise to a sensation of "heat" or "burning." (Baker.)

receded somewhat, though it was still low. Heat and cold were on this side everywhere recognized as such. At this time some gross observations were made to determine the sensory threshold values over these areas, with the following result: In the neck above the level which corresponds to the lesion, the threshold for pain as elicited by heat stimuli was 52° C., while a temperature of 40° C., which feels but slightly warm to the neck, causes distinct pain with recoil over the "cold-pain" zone on the right side, and feels "hot." Here also the cold tube at 35° C. gives an acute sensation of pain. Over the zone on the left, the slightly analgetic side, the threshold of pain as tested with heat stimuli was high, a temperature near the boiling-point being necessary to produce it, and only at this high temperature was there any thermic impression perceived. Cold produced pain, as on the right, when only a little below the body temperature.

Status præsens (six months after the reception of injury). There is complete retrogression of motor paralysis in the leg except for some weakness in Mann's residuary hemiplegic group. Slight paresis in the right arm persists, with reduced irritability of all muscles below the triceps level to galvanic and faradic stimuli. Paralysis is apparently complete, with atrophy, in the abductor indicis alone, but the muscle responds feebly to both currents, whether applied directly or transmitted through the nerve. The contraction to galvanic is very slight and slower than normal.

The deep reflexes remain exaggerated on the right side. There is a patellar and ankle-clonus. Myotatic contractions also in the muscles of the arm are elicited with ease. The increased muscular tone tends to hold the arm quite rigid, so that passive motion meets with marked resistance. The extent of mobility in the joints is quite limited. Forced motion causes severe pain, especially in the shoulder and phalangeal articulations. This is most pronounced in the little and ring-fingers, which are very stiff.

Some trophic disturbances persist in the fingers, which are tapering and somewhat shiny. The nails are curved and brittle, and the patient thinks they grow much faster than on the other hand.

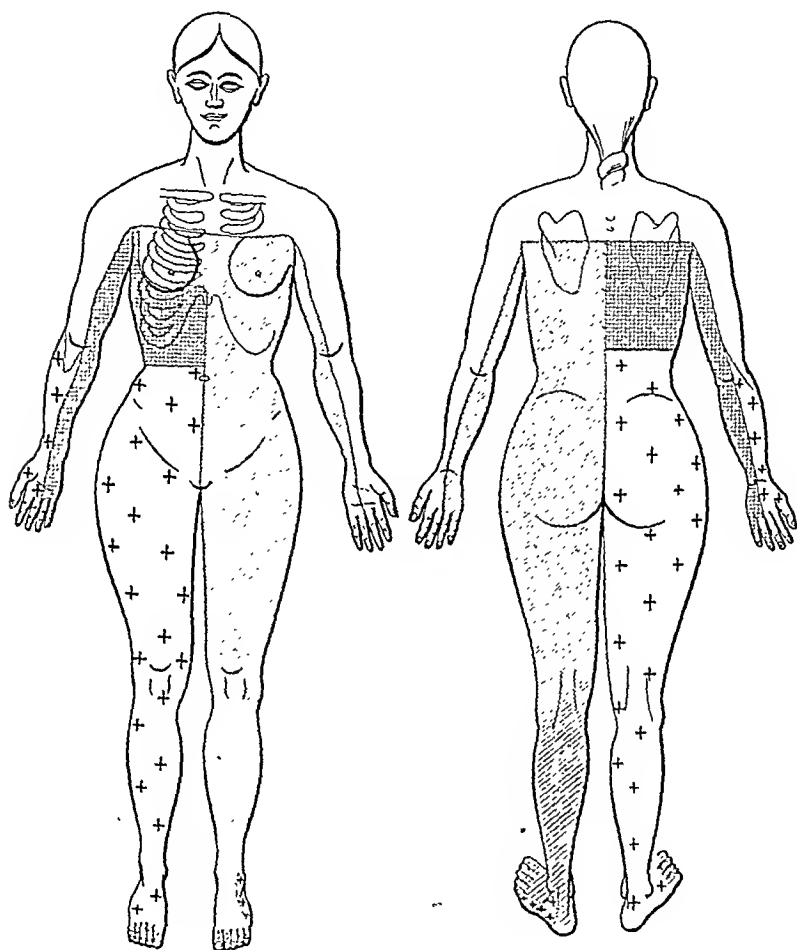
Subjectively, there is great annoyance from pain, described as "darting and burning," in the arm, especially referred to a region on the anterior surface above the wrist. These sensations, at times spontaneous, are aggravated by any exposure, especially to cold. A chance drop of cold water makes her cry out.

Sensory disturbances persist as follows (May 20, 1897, one hundred and ninety-five days):

1. *Disturbances of pain and touch or pressure.* (Fig. 3.) There is slight anæsthesia to pain and a very slight but distinct dulling of sensibility to touch or pressure (tested by a soft camel's-hair brush) over the areas of original anæsthesia. This is not true, however, for the right arm. Here, by a comparison with Fig. 1, we find that the original segmental area of anæsthesia has been replaced by one of great hyperæsthesia. The segmental sensory paralysis has receded to a level below that of the residual segmental motor paralysis, which persists in muscles corresponding to the eighth segment. It is now limited to the half zone on the chest, from the second to the fifth interspace and only in front. There is a half zone of hyperæsthesia below this. The area below the external malleolus on the left not noticed as differing from the

rest of the left side at entrance, and perhaps overlooked, now shows a marked hyperæsthesia to pain and cold stimuli and a greatly lowered sensibility to touch or pressure.

FIG. 3.



Touch and pain (sixth month).



Slight anaesthesia to pain and touch.



*Great hyperæsthesia to pain. (Threshold very low.)
Touch unimpaired.**



Slight hyperæsthesia to pain.

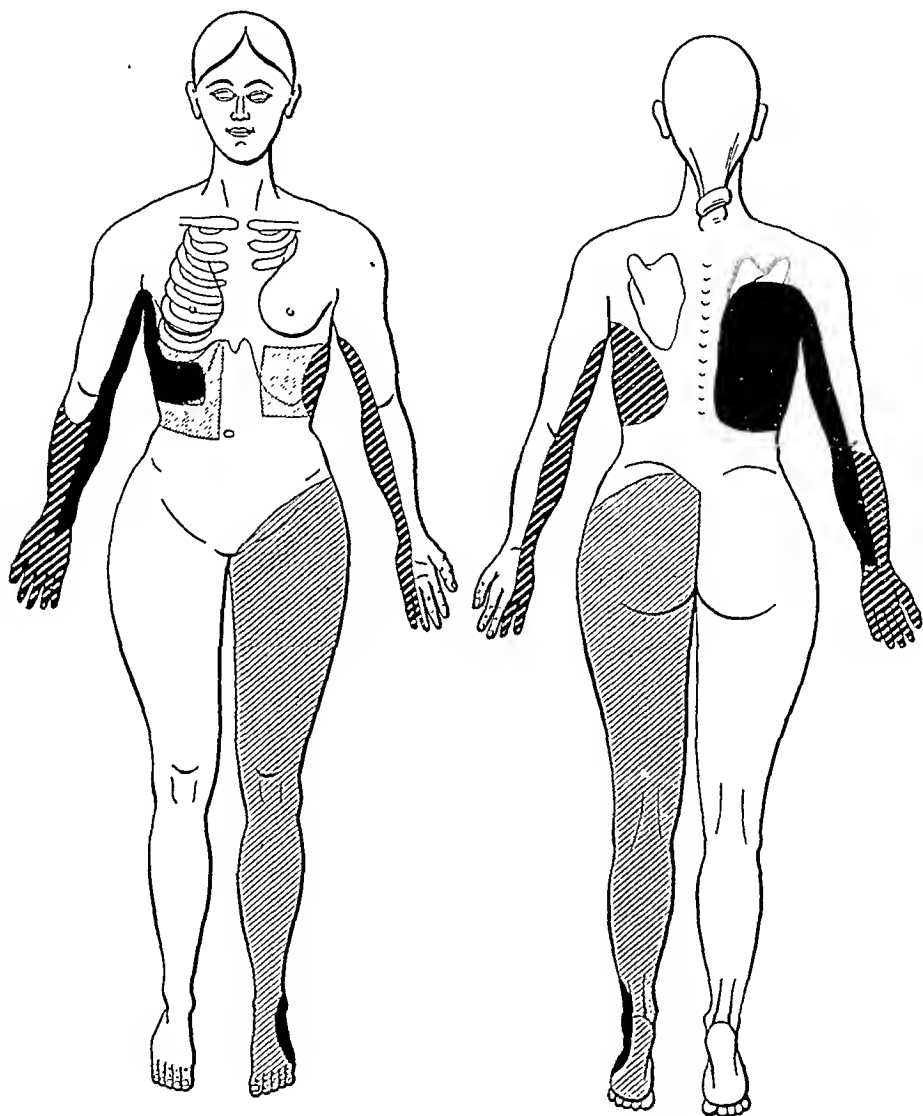


Hyperæsthesia to pain. Tactile anaesthesia.

* The low pain threshold made this difficult of demonstration. Touch with a wisp of cotton sometimes felt "sharp" to the patient.

2. *Thermic disturbances.* (Fig. 4.) *Cold* at present is nowhere interpreted as heat. It gives its proper thermic sensation, though perhaps dull. Over the areas in black (Fig. 4) the pain threshold to cold remains

FIG. 4.



Heat and cold (sixth month).



Areas of Extreme "Cold Pain."



"Cold Pain" less marked.



Cold produces slight pain.

Heat and Cold
recognized as such,
though perception dulled.

very low. Some pain is called forth over the right leg which heretofore had not been observed.

Heat is everywhere recognized as such, but is much dulled over the whole left side below the second interspace and over the right segmental

areas of the arm and chest, where a high temperature feels barely warm.¹

THE NATURE OF THE SPINAL LESION. A variety of morbid processes might have produced a symptom-complex similar to the foregoing. With the data at hand an absolute diagnosis is precluded, and conclusions may only be drawn from the few reported cases of a similar nature which have allowed of subsequent examination.

A crush of the cord from vertebral subluxation, with immediate reduction, as is supposed to happen in acute flexures of the spine, is a most commonly ascribed injury, especially in this region of the column. Further, a laceration of the cord from fracture, by a spicule of bone torn off by the missile, or from the missile itself, might be the offending process, or, lastly, hemorrhage, whether into the membranous envelope of the cord (hæmorrhachis) or into the very cord substance (hæmatomyelia).

Mitchell, Morehouse, and Keen,² who had such exceptional advantages for observations of gunshot injuries of nerves, drew especial attention to the fact that the mere passage of a bullet near the spine may so jar the delicate organization of the cord as to cause paralytic symptoms. To this condition they gave the name commotion or concussion of the spine, from the belief that the comparatively transient nature of most of the symptoms was not compatible with the existence of any gross lesion. Commotion and concussion, however, seem merely to imply a degree of hæmatomyelia with minute hemorrhages into the cord, and, as we shall see, extensive destruction from intramedullary hemorrhage may be followed by restitution, almost complete as that of the cases included under this heading. Thorburn³ accounts for the lesion in his series of cervical cases in which, at autopsy, no injury of the spinal column was demonstrable, by a subluxation, as described above, due to supposed acute flexures of the neck. We can hardly imagine in our case that a bullet of 32-calibre, especially with a lateral blow, could cause such a subluxation with a resultant injury to the cord, though the results were the same as observed by him. Also considering the position of the bullet as demonstrated by the skiagraphs, lodged in the centrum of one of the vertebræ, its whole course having been anterior to the arches, it does not seem likely that a laceration of the cord could have been produced by any dislocated spicule of bone.

Between hæmorrhachis and hæmatomyelia no absolute means of

¹ There seems to be considerable variability in the patient's recognition of thermic stimuli. An examination in December, 1897, revealed the following condition on the left side:

Tactile perception normal; common sensibility (pain) slightly dull; cold, even when near body temperature, is "hot," and ice "burns;" heat feels but slightly warm, even when near the boiling-point. The condition otherwise was much as on May 20th.

² Mitchell, Morehouse, and Keen: *Gunshot Wounds and Other Injuries of Nerves*, 1864.

³ *Op. cit.*, page 64.

differentiation have been laid down, which is unfortunate from an operative stand-point. There is a great difference of opinion as to their relative frequency. Manley,¹ partly from post-mortem observations and partly from his inability to produce it experimentally, has claimed that intramedullary hemorrhage is of great rarity. He stands practically alone in this assertion. Thorburn believes that the number of cases of traumatic hæmatomyelia is much underestimated. Six out of his twenty-one cases of injury to the cervical spine showed hemorrhage into the cord and unaccompanied by any apparent injury to the column itself. In but one of his cases² did he question the possibility of meningeal hemorrhage, and then only because he could not believe in the existence of intramedullary hemorrhage without destruction of the ganglion cells of the ventral horn and consequent atrophic paralysis in some muscles of the upper extremity. That this muscular atrophy may not occur, and yet there be extensive hemorrhage into the anterior horn and destruction of motor cells, is well illustrated by Mann's case,³ the similarity of which to Thorburn's and to our own cannot but confirm a belief in the presence of a similar lesion. In addition there was a distinct history of pyramidal tract degeneration. In another of Thorburn's cases (Case XV., p. 43), one of dislocation of the fifth cervical vertebra, similar paralysis, motor and sensory, resulted. The disturbances in the arms he believed to have been occasioned by pinching of the peripheral nerve-roots on one side and dislocation on the other. A true spinal hemorrhage could more simply have accounted for the whole lesion. The condition of the reflexes and all else was very similar to the one under discussion. Contrary to Manley's view, the literature appears to point to the comparative infrequency of the meningeal form. Parkin⁴ reports a series of these cases, all of intramedullary hemorrhage. The observations of Minor⁵ in five cases, and of many others, lend confirmation to this view.

Clinically, the two are often impossible to distinguish. Their symptom-complex is very similar, and in both there is the same apoplectiform onset. In meningeal hemorrhages the chief stress is laid upon the irritative phenomena. Acute and immediate spinal pain, increased by spinal movements, is a constant symptom. Radiating (*ausstrahlenden*) pain from the supposed pressure of the blood on the spinal roots, and referred over their distribution, is also most characteristic, and on it Kocher lays especial stress. In our case, though there was great complaint of "pain," it was not of a radiating character, nor was there any localized spinal sensation. The "pain" was felt as a "being asleep" (what the

¹ Manley: "Traumatic Lesions of the Spine," etc. Abstract in *Journal of Nervous and Mental Diseases*, 1891, xvi. p. 350.

² Op. cit., Case XXI.

³ Loc. cit., Fall vi.

⁴ Alfred Parkin: "Seven Cases of Intraspinal Hemorrhage (Hæmatomyelia)." *Guy's Hospital Reports*, 1892, lxviii. p. 107.

⁵ S. Minor: "Central Hæmatomyelie" *Archiv f. Psychiatric*, 1892, xxiv. p. 694.

Germans describe as *Eingeschlafensein*), and it extended over a wider area than could be accounted for by peripheral irritation. In the intramedullary cases, on the other hand, the paralytic symptoms of motility or sensibility are most in evidence, and, for reasons to follow, are very commonly combined in the Brown-Séquard type. These paralytic phenomena progress rapidly, and soon after the attack reach their full development. They may be accompanied by pain, as Leyden¹ suggests, either through lesion of the dorsal horn itself, or by compression on the dorsal roots, caused by the swollen cord, different in character, however, from the radiating pains spoken of. Hyperæsthesiæ, phenomena of motor paralysis in the lower extremity, reflex disturbances, including those of the bladder and rectum, may occur with hemorrhage at either site, and when at the level of the cervical enlargement, brachial diplegia from implication of the centres themselves or of the peripheral nerve-roots. These symptoms are of much shorter duration, however, in the meningeal form, and though the case under discussion showed a rapid subsidence of many of its symptoms, the evidence of descending degeneration of the right pyramidal tract and the persisting sensory picture, so closely akin to syringomyelia, together indicate an insult to the cord-substance, which pressure from meningeal hemorrhage could not have produced. The existence of a combined lesion, of course, is possible, but unlikely. A particular feature brought out by Thorburn's extensive series of observations was that hæmatomyelia existed in no cases other than in the cervical one. He says,² "above and below this section of the cord I have not met with a single instance of traumatic hæmatomyelia." This he attributes to the fact that many of his cases were caused by acute flexion of the neck, with supposed temporary vertebral displacement, the action of which from the anatomy of the column would be felt in the lower part of the cervical enlargement, producing hemorrhage, though without demonstrable injury to the spine itself. He thus accounts for the limited focus of the lesion, holding the concussion theory untenable from the belief that a bruise would show itself spreading over a larger and less sharply defined area. Similarly, Parkin's six cases were of intraspinal hemorrhages and at this same definite cervical area. From a further study of recorded cases it seems that not only those cases attributable to acute flexions of the neck, but also those in which this presumably did not occur, as from falls on the back without flexion of the neck,³ lateral flexion,⁴ direct violence,⁵ hy-

¹ Leyden-Goldschelder: "Die Erkrankungen des Rückenmarkes und der Medulla Oblongata." Wien, 1895.

² Op. cit., p. 61.

³ Mann: *Loc. cit.*, Fall vi. Thorburn: *Op. cit.*, Case 18.

⁴ Barllug. "Injury to the Cervical Spine. Hæmatomyelia with Paralysis." Birmingham Medical Review, 1893, xxxiv. p. 149.

⁵ Thorburn: *Op. cit.*, Case 16.

Hans Schmaus: "Beiträge zur pathologische Anatomie der Rückenmarkserkrankung." Virch. Archiv, 1893, cxxli. p. 326, Beobacht. III.

per-extension,¹ the few gunshot injuries reported,² and various forms of traumatism, as from being run over,³ all give a similar picture. In a few cases, where a bullet lodged at a region slightly remote, as in the upper dorsal or middle cervical regions, did a similar definite localization of symptoms result.

It is well recognized that intramedullary hemorrhage selects the gray matter of the cord, presumably from the less firm support given to the vessels there. In the cervical enlargement where the amount of gray matter is large the condition would be favored. The fact, however, that the hemorrhage is, with few exceptions, into the same level of this enlargement, picking out with little variation primarily the same segmental area, is strongly suggestive of the fact that there exists in the gray matter of the lower cervical enlargement a certain vessel or vessels which are less resistant to traumatic forces and more apt to give way, just as under diseased conditions in the brain one particular vessel, namely, Charcot's artery of cerebral hemorrhage, is the one most apt to rupture under any especial strain.

The similarity of the reported cases is most striking throughout their whole progress. In illustration, probably all of Thorburn's cases; five of Parkin's six cases, with post-mortem confirmation in four; Minor, in five cases from cervical trauma, in his article on "Central Hæmatomyelia;" Hoch, Lloyd, Stembo, Shigago, Wilkens, Sehmas, Robinson, and others, as in the gunshot cases above cited, all report cases with hemorrhage at this level; while at other regions, unless there is some gross spinal lesion with deformity, traumatic hæmatomyelia is of comparative rarity. We, perhaps, may look upon the lower cervical enlargement up to the triceps level as the site of predilection for hæmatomyelia⁴ of traumatic origin, its primary focus being at the eighth cervical segment.

Few of the cases, however, have allowed of subsequent examination, and for that reason Mann's⁵ article sheds much light on the extent of lesion compatible with practical recovery.

¹ Parkin: Loc. cit., Case 2.

² Charcot: "Sur un cas de paralysie radriculaire de la première paire dorsale, avec lésion hémilatérale de la moelle, d'origine traumatique simulant de syringomyélie." *Archiv. de Neurologie*, 1891, xxii. No. 65.

Haven: "An Unusual Case of Gunshot Wound of the Cervical Spine" *New York Medical Record*, February 15, 1896, xlix.

Thorburn; Op. cit., Case 21.

Preston: "Brown-Séquard Paralysis, with Report of a Case." *Journal of Mental and Nervous Diseases*, October, 1896, xxi. p. 645.

J. K. Mitchell; Op. cit., Case 31.

³ Stembo: "Ein Fall von centraler Hæmatomyelie." *St. Petersburg. med. Woch.*, 1894, Bd. xix. S. 128.

Thorburn: Op. cit., Case 19.

⁴ Berkley ("Syringomyelia." *Brain*, 1890, xii. p. 465) has pointed out the fact that in primary hæmatomyelia, non-traumatic, the cervical enlargement is the favorite seat.

⁵ Mann: Loc. cit.

His case, though the symptoms were slightly more intense than in the one here recorded, is so much akin to it, the lesion in both being situated at this elective site, the symptoms in both representing a type of the so-called Brown-Séquard paralysis, that his post-mortem findings are of especial interest. At the time of necropsy, three years after reception of the injury, there remained symptoms almost the counterpart of the present residuum in our case, except for the persistence in his of the bilateral intercostal paralysis which was indirectly the cause of death.¹

Mann's findings at autopsy showed the spinal membranes intact, a unilateral cavity representing the old hemorrhage limited in level to the eighth cervical segment, with practical complete absence of all nerve elements on one side. There was a partial destruction on the opposite side, where almost the whole gray substance was transformed into connective tissue, and, though but few ganglion cells were recognizable in the anterior horn, no atrophic paralysis had resulted in the muscles of the corresponding upper extremity.

The pathology of these cyst-like cavities resultant to localized hemorrhages is carefully described by Leyden² and others.³ Goldscheider, by injection into the cords of cadavers, found that the gray substance and chiefly the posterior horn is favorable to the spread of hemorrhage, which well explains the frequent persistence, as in our cases, of the symptoms of syringomyelia. This association of traumatism with syringomyelia has often been noted.⁴ In cases in which the symptoms of this affection appear suddenly or even at a later date, we may with probability suspect the occurrence of hæmatomyelia. Their similarity was first noted by Minor⁵ and the relation of the hemorrhagic cavity formation to the syringomyelia syndrome by Langhans and Kronthal. Robinson,⁶ Lloyd,⁷ Bruhl,⁸ Stembo,⁹ and others have called attention to it, and its occurrence was noted in many of the cases above referred to.

The conclusion, that the great majority of these cases are of intramedullary hemorrhages, from a surgical stand-point, is distinctly disap-

¹ The examination in Mann's case showed a tract of descending degeneration in the posterior columns which led to the hypothesis that it was a special path subserving the motor function of the intercostal muscles. This may illustrate an especial provision on the part of nature to protect the vital process of respiration. In the case of Parkin's, in which the phrenic centre was involved and also paralysis of the lower extremities, showing pyramidal tract involvement, the costal and abdominal muscles were intact, which is interesting in this connection.

² Loc. cit., p. 347.

³ Bruhl: "Syringomyélie," Thèse, Paris, 1889-90; Mann: loc. cit.; Minor: loc. cit.

⁴ Reynès: "Hémi-anesthésie et Hémi-paralysie croisées (Syndrome de Brown-Séquard) suite de Commotion Médullaire." *Gaz. des Hôpitaux*, Paris, March 23, 1895.

⁵ Minor: "Beitrag zur Lehre der Hämato- und Syringomyélie." *Verhandl. des X. Internat. med. Cong.*, Bd. IV. S. 4. Berlin, 1890.

⁶ Robinson: "Sur un cas de Syringomyélie débutant comme une Hæmatomyélie." *Journal de Méd. de Paris*, 1891, p. 90.

⁷ Lloyd: "Traumatic Affections of the Cervical Region of the Spinal Cord Simulating Syringomyelia." *Journal of Nervous and Mental Diseases*, 1894, xix. p. 315.

⁸ Bruhl: Op. cit.

⁹ Stembo: Loc. cit.

pointing, as the meningeal form alone seems at present to offer hope for operative interference. In the cases which have come to operation it would seem that the myelitis which the further trauma of the cord has produced is most apt to carry the paralysis to a point higher than that of election, so producing death from dyspnoea, due to involvement of the phrenics.

THE SITE AND EXTENT OF INJURY. This ordinarily offers less diagnostic difficulty than its nature, though, at an early period following its reception, shock may mask somewhat the degree of interruption of the conducting paths.

1. *The level of lesion.* The upper limit of this on the right side we may locate with comparative precision both by the motor and the sensory disturbances. It corresponds exactly to the lesion of the cervical cord which Krauss¹ designates as the "typus inferior," in contradistinction to the "typus superior" of cervical enlargement lesions, the triiceps apparently being the hinging point between the two and ordinarily involved with the former type. It reaches Thorburn's "fifth" root group. Comparison with Starr's familiar table² shows that the "high-water mark" of injury, as shown by muscular involvement, included the sixth cervical segment and affected to a degree the fifth, for there was distinct paresis of deltoid, biceps, supinator longus, etc.

On the left total interruption of function was limited to the eighth segment, possibly due to compression alone on the anterior horn, for there was no pyramidal tract involvement, and, as we shall see, this is opposite the site of the chief injury. It must be remembered, however, that Sherrington has proved that individual muscles are represented by more than one segment, and the animal experiments of Ferrier and Yeo³ show that section of one nerve root merely spoils a certain elaborate co-ordination movement without paralysis of any one muscle, so that only approximately from the motor paralysis may we estimate the level of the lesion.⁴

By the sensory symptoms it may often be located with more exactness, despite the fact of the overlapping of sensory root cutaneous fields noted by Sherrington,⁵ for Head⁶ claims that the tactile fields alone

¹ Krauss: "Die Bestimmung des betroffenen Rückenmarksegmentes bei Erkrankungen der unteren Halswirbel." *Zeitsch. f. klin. Med.*, 1890, Bd. xviii. p. 343.

² M. Allen Starr: "Local Anæsthesia as a Guide in Diagnosis of Lesions of Upper Portions of the Spinal Cord." *Brain*, London, 1894, xvii. pp. 481-511.

³ Ferrier and Yeo: *Proceedings of Royal Society of London*, March 24, 1881, No. 212, p. 12. "The Localization of Atrophic Paralysis." *Brain*, London, 1882, vol. iv. p. 217.

⁴ The uncertainties of localizing cord lesions by motor paralysis alone are thoroughly discussed by Bastian. *Quain's Dictionary of Medicine*, ii. p. 811.

⁵ Charles S. Sherrington: "Experiments in Examination of the Peripheral Distribution of the Fibres of the Posterior Roots of Some Spinal Nerves." *Transactions of Royal Philosophical Society of London*, 1893, clxxxv. B. p. 641.

⁶ Henry Head: "On Disturbances of Sensation with Especial Reference to the Pain of Visceral Disease." *Brain*, 1893, xvi. p. 1.

overlap, while those for thermic and pain impressions do not, making them of chief value in segmental localization.

The upper limit of sensory disturbance must be sought in the arms,

FIG. 5.

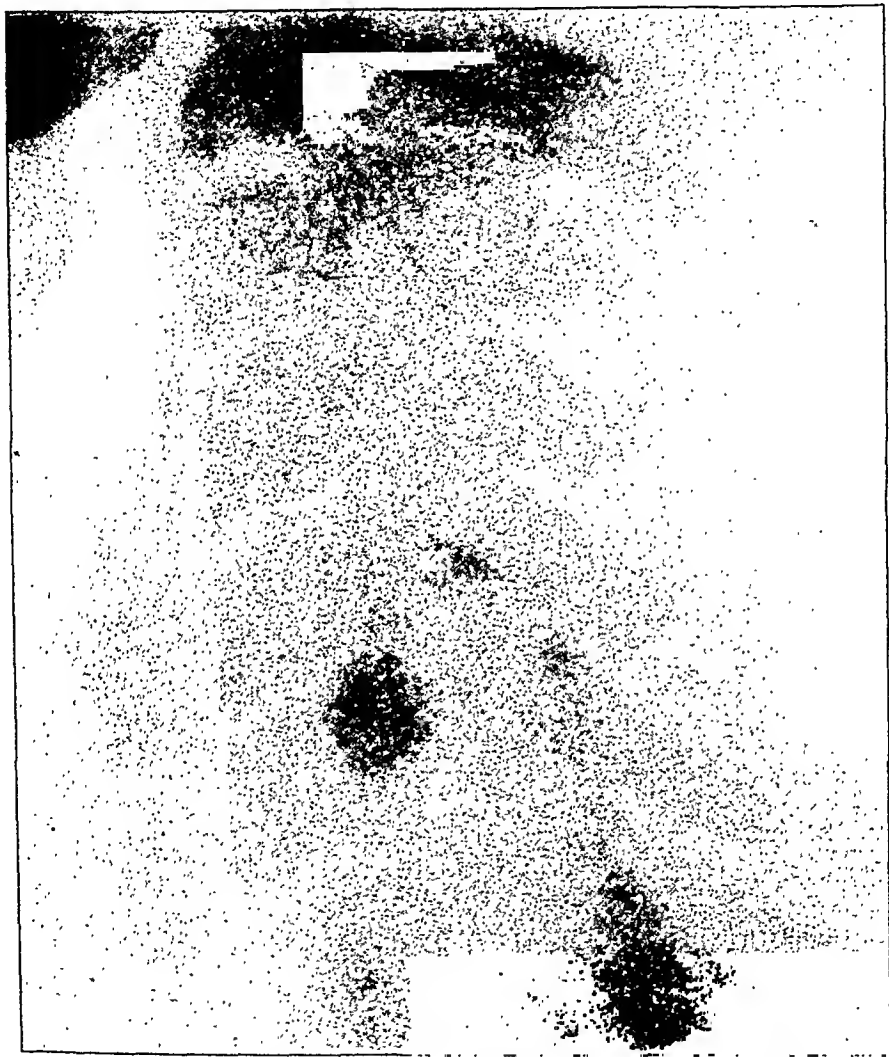


CASE I.—Skining showing bullet in the sixth cervical vertebra.

for the thoracic level in cases of cervical lesion remains constant at the second or third rib, corresponding to the distribution of the descending branches from the cervical plexus. Our case being of the nature

of a right hemilesion, we look to the left arm and find that the area of anæsthesia to pain and temperature includes the D₁. segment of Kocher's¹ figures, the D₁. and C_{VIII}. segments by Starr,² which corresponds

FIG. 6.



CASE I.—Lateral view.

to the final level of residuary motor disturbance in the right arm. Reid³ has carefully studied the relation of the cervical spines to the various cord segments, and though there is slight variation the C_{VIII}. segment corresponds to the sixth cervical vertebra, and the evidence of the skiagraph showing the bullet impacted in the body of this vertebra was gratifying, though, as before suggested, a similar lesion might have been produced by its lodgement anywhere in the vicinity.

¹ Kocher: See diagrams; loc. cit.

² Starr: See diagrams; loc. cit.

³ R. W. Reid: "The Relations between the Superficial Origins of the Spinal Nerves from the Spinal Cord and the Spinous Processes of the Vertebrae." *Journal of Anatomy*, 1889, vol. xxiii.

The disturbed sensory areas on the right naturally reach a higher level, namely, to that which was spoken of as the "high-water mark" of motor paralysis, the fifth root level, as interruption of their fibres occurs on the side of the lesion and before decussation. The vertical extent of injury is less satisfactorily told. It is supposed to correspond to the breadth of the zone of anæsthesia on the side of injury, which reached the sixth rib in front and lower on the back. Further, the motor paralysis on the opposite side might help to decide this. It included, however, the thoracic and abdominal muscles, which seems an unlikely extent of hemorrhage, and which cannot be accounted for unless we accept Manu's interesting suggestion of an especial motor path subserving these respiratory muscles.

2. *The extent of lesion.* An early recognition of the degree of spinal cord injury often is impossible, as the symptoms depending on actual destruction may be complicated by those due simply to compression and degenerative changes. The above case, as did Manu's, presented features of a partial transverse lesion of the type of hemiplegia spinalis, though some of its symptoms passed beyond those of a pure hemilesion, and indicated an actual involvement of the gray matter of the opposite side, more extensive than could be explained by pressure or œdema. These symptoms, indicating more than a unilateral lesion, were as follows:

1. The relatively large extent of sensory disturbance on the right, the side of motor paralysis, going beyond the usual zona anæsthetica of hemilesion, and only explicable by the assumption of a lesion on the left side extensive enough to destroy a part of the sensory paths already crossed in addition to the segmental fibres on the right entering at the level of lesion.

2. The temporary paralysis of the left upper extremity and augmentation of reflexes on that side. They should be unchanged in pure unilateral injury.

3. The bilateral paralysis of the intercostal and abdominal muscles.

4. The involvement of the bladder and rectum, which in pure hemilesions does not occur.

5. A temporary lowering of the sense of touch on the side of lesion. Though Kocher has noticed this condition in a case of hemilesion, it is possibly due to some involvement, more than unilateral, of the various tracts subserving tactile impressions.

With these exceptions the clinical symptoms correspond to those of hemilesion at the cervical enlargement. With some reserve, and with no attempt at physiological explanation, the following picture, adapted from Kocher and illustrated by our case, is given as the interpretation of the so-called Brown-Séquard paralysis in this instance of cervical hemilesion. This, it will be noticed, differs from the original concep-

tion,¹ which had to be modified as a result of the recent investigations of Mott² and others, and was renounced even by Brown-Séquard himself.

On the injured side. 1. Motor paralysis of the lower extremity, to disappear in a few weeks, presumably through the decussating neurones of the opposite side (Turner). These reserved fibres are believed (Edinger) to pass from the anterior tract through the anterior commissure³ to the opposite anterior horn, playing a larger rôle for the leg than the arm.

Paralysis of intercostals and abdominal muscles on this side, perhaps subserved by a special path (Mann), to disappear at a later time, also possibly by decussation.

Atrophic flaccid paralysis of those muscles in the upper extremity, representing destruction of anterior horn ganglion cells, though by no means corresponding to its extent, and practically absent here.

2. Atrophy, temporary, of muscles of the same side more than can be accounted for by inactivity.

3. Paralysis of vasomotor fibres, temporary, with elevation of surface temperature of paralyzed side.

4. Early diminution or abolition following diminution of deep reflexes, with subsequent exaggeration and spastic condition, as in the animal experiments of Ferrier and Yeo. (An explanation might be given of this abolition by supposing only a partial interference of function of this half of the cord, rendered complete in a few days by a spreading myelitis, but there was no other evidence of such a process.)

5. Temporary suspension of muscle-sense. (The whole question of the disturbance of muscle-sense and pressure-sense in Brown-Séquard paralysis remains still *sub judice*. Experimental and clinical data give many contradictory results.)

6. Hyperalgesia of the whole side below a segmental zone of analgesia which corresponds to the level of lesion. Thermic and tactile anæsthesia may also be present over this zone, but are elsewhere unimpaired. A lowered sensation of touch is said to occasionally occur in man (Vix and Kocher). (There was a slight lowering in our case, but it was supposed to have been occasioned by the more than unilateral nature of the lesion, for consensus of opinion would lead to the belief that in pure hemilesion tactile sense remains unimpaired except over the zone of anæsthesia corresponding to and on the side of the lesion.)

¹ Brown-Séquard: *Journal de Physiologie*, 1863, pp. 124 et seq.

² F. W. Mott: "Results of Hemisection of the Spinal Cord in Monkeys." *Transactions of Royal Philosophical Society*, 1892, clxxxiii. p. 1.

³ v. Lenhossék ("Der feinere Bau des Nervensystems im Lichte neuester Forschungen," ii Aufl., Berlin, 1895), in extremely careful studies of the human cord by Golgi's method, has, however, never been able to find any axones from the anterior pyramidal tract which passed through the anterior commissure to the anterior horn of the opposite side. He believes that the fibres of the anterior tract terminate in the anterior horn of the same side.

7. Oculo-pupillary symptoms; these being contraction of the pupil, slight ptosis, narrowing of the palpebral fissure, and diminished tension of the globe (Kocher), with hyperæmic changes in the disk (Thorburn). (These symptoms were not noted in our case. Either the involvement of the opposite half of the cord was sufficient to affect the centrum ciliospinale there as well, and prevent any marked asymmetry of symptoms on the two sides, or the examination was not made with sufficient care till a later date, when they were certainly absent.)

8. Disturbances of the vesical, anal, and priapismic reflexes may be wanting in pure hemileision, though always an accompaniment of total transverse lesions.

On the opposite side. Eleetive sensory paralysis, which varies in intensity and quality in different cases. Touch, in our case slightly dulled, is often unaffected, paths for its conveyance being probably more than single in the cord, and perhaps unerossed. Anæsthesia to pain, heat, and cold, usually complete and often permanent, here were temporary. The lateral limiting layer, looked upon with great definiteness as a path for these crossed sensory fibres (Edinger), from its proximity to the gray matter, naturally receives a serious injury in hæmatomyelia. That the analgesia disappears as the hyperæsthesia of the opposite side diminishes (Kocher) was here observed. The thermic sensibility partially returns, if at all, only after restoration of pain, and then of tactile sensibility, if the latter has been disturbed. The sensation of heat may return first and of cold later (Rosenthal).

In conclusion, attention is drawn to the following points:

1. Paralytic symptoms following traumatism in the cervical region, when there is no resultant spinal deformity or laceration of the cord, are in the majority of cases due to hemorrhage into the substance of the cord.

2. For this hemorrhage there seems to be a site of predilection in the lower part of the cervical enlargement, producing the symptoms of the "typus inferior" of Krause.

3. The hemorrhage, as a rule occurring primarily on one side, leads to symptoms of a Brown-Séquard type of paralysis.

4. The deep reflexes on the side of hemileision may be retained for a time, then disappear and finally return, to become exaggerated.

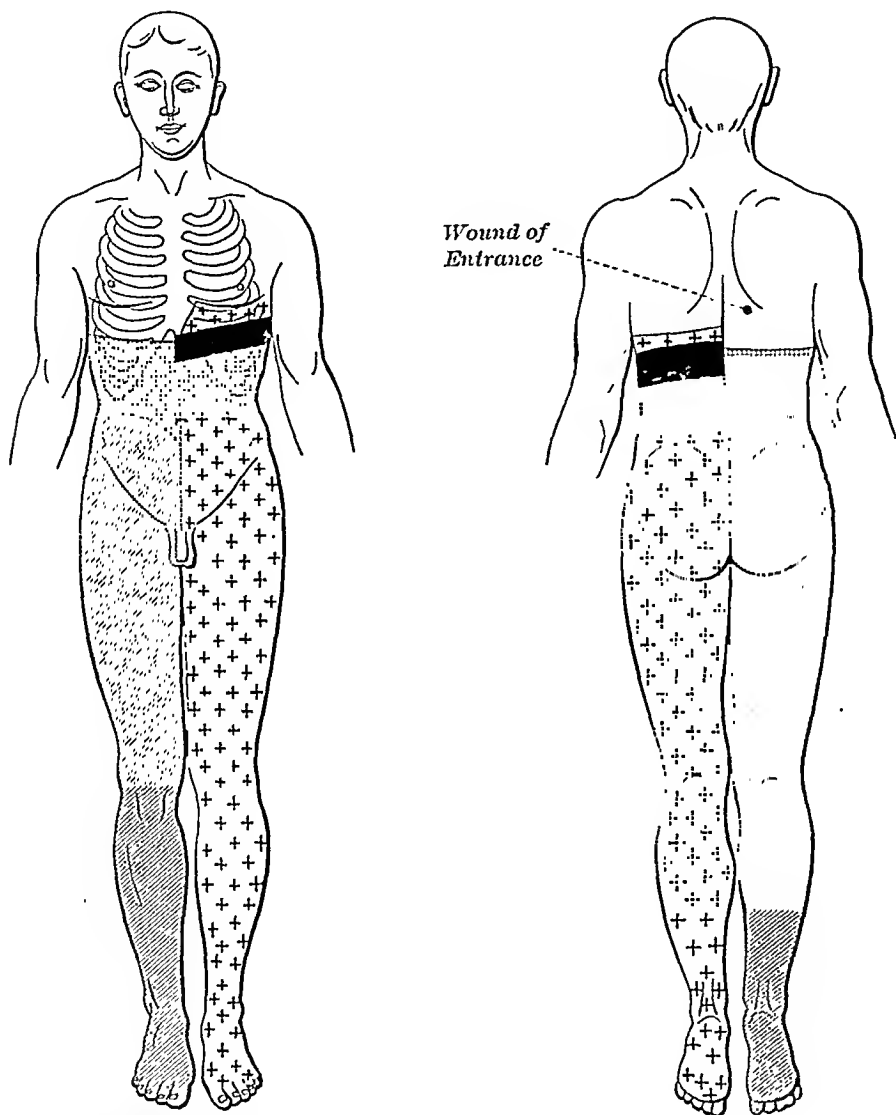
5. The hemorrhage, being primarily into the gray matter, and in its resolution often leading to cyst formation, is productive in many cases of a symptom-complex quite like that of syringomyelia.

6. The immediate prognosis¹ of this type of hæmatomyelia is good


¹ A late prognosis is more uncertain. J. K. Mitchell (op. cit., p. 103), in following up the histories of cases of spinal trauma occurring twenty five years previously, arrived at the important conclusion that "no seemingly perfect return to health, even though it should have lasted several years, will bar out the possibility of late sclerotic and other changes."


without operative interference, even in the cases of gunshot wound when they are uncomplicated by sepsis.

FIG. 7.




Case II. Condition at entrance.

 *Total Anaesthesia.*

 *Analgesia. Thermoanaesthesia.*

 *Hyperaesthesia.*

 *Extreme Hyperaesthesia espec. to thermic stimuli.*

I wish to express my indebtedness to Dr. Lewellys F. Barker and to Dr. H. M. Thomas for their kindly interest and aid in the preparation of this report.

Since the completion of the above report there has been admitted into the wards of the hospital a similar case of gunshot wound of the spine, preliminary note of which is here given. The injury was in the dorsal region, and except for the differences due to this lower level of lesion, and its limitation absolutely to one side, the symptoms were a mild counterpart of those in Case I. The clinical picture was that of a pure Brown-Séquard paralysis.

CASE II.—The patient, a boy aged fourteen years, was shot in the back November 20, 1897, with a 22-calibre revolver. He fell to the ground, without loss of consciousness, and found that he could not move his left leg. Examination on admission, twenty-four hours after the injury, reveals a small wound of entrance 5 cm. to the right of the seventh dorsal spine. The skiagraph shows the bullet lodged in the centrum of the eighth dorsal vertebra. The left leg is completely paralyzed and hyperæsthetic; the right anæsthetic to all stimuli but that of touch. The patient complained of numbness in his left leg, as though it were asleep, and there is a sensation of tightness about his abdomen, and lancinating pains which are augmented by the slightest touch and which correspond to a belt of great hyperæsthesia.¹ (See Fig. 7.)

SYMPTOMS AND PROGRESS. *Motor symptoms:* Paralysis remained complete in the left leg until the fifth day, when motion was first observed as a slight contraction of the quadriceps femoris, so that he could partially straighten his leg when flexed. Motion in a few days was possible in all directions. At present a marked paresis remains in the dorsal flexors of the foot, as well as in the rest of Mann's group, which gives the patient the dragging gait of a hemiplegic. He was up and walking about by the third week. No loss of muscle-sense could be detected at any time.

The reflexes: On the left, the side of the paralysis, the same sequence was observed in the deep reflexes as in Case I., viz.: forty-eight hours of persistent and moderate activity, followed by complete abolition for three days, with a subsequent return and progressive augmentation. At present there is a most active ankle and patellar clonus, and myotatic contractions are also produced in the gluteus and hamstring muscles by tapping on their tendinous insertions. On the opposite side there was a slight exaggeration of the deep reflexes at first; since, they have been normal. Superficial reflexes, both plantar and cremasteric, were absent on the left side for the first week or two. There was considerable difficulty in evacuation of the bladder and rectum.

Sensory symptoms. (Fig. 7.): *Touch* was unaffected, except for a small zone on the paralyzed side at the level of the lesion. This narrowed and was lost by the second week. *Pain:* The analgesia of the right leg, observed at entrance, had disappeared by the third week, as had the hyperæsthesia on the left. In a zone about the body, however, hyperæsthesia was extreme, and over it all stimuli called forth especial pain. A slight degree of cold would bring tears to the patient's eyes. This zone gradually disappeared from the right and receded into a small area on

¹ It is noteworthy that this cutaneous hyperæsthesia produced a protective spasm of the abdominal parietes, just such as intraperitoneal inflammation calls forth, and had not the bullet been located by the x-rays in the vertebra, it would have been difficult to believe that there was not a penetrating wound of the abdomen from behind.

the left side, where it persists. *Thermo-anæsthesia* was present on the right leg, where all stimuli were recognized as slight warmth. As in Case I., a small area under the internal malleolus was observed during the third week, where cold was recognized as such and caused pain. This area of returning thermic sensibility, associated with some hyperæsthesia, gradually spread up the leg and had in a month reached the knee, below which varieties and degrees of thermic stimuli were readily recognized.

In both of these cases, therefore, following the lodgement of a bullet in the body of a vertebra have appeared symptoms of spinal lesion, with apoplectiform onset and a Brown-Séquard type of paralysis. Pyramidal tract degeneration has resulted, leaving its residuary paralysis in the lower extremities and, in Case I., involvement of ventral horn ganglia of the cervical enlargement has resulted in trophic changes with atrophy of some muscles. In each a residuum of sensory disturbances on the anæsthetic side persists as partial thermo-anæsthesia, and over a zone below the level of the lesion and on the same side remains some hyperæsthesia to pain which cold stimuli especially call forth. On the side of lesion in both cases the deep reflexes were retained for a time, then lost, and finally returned to become permanently exaggerated.

THE VOMITING OF PREGNANCY.¹

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IN accordance with the views concerning its pathogenesis, to be hereafter advocated, vomitus gravidarum may be defined as vomiting during pregnancy, due to a variety of immediate causes acting upon the abnormally irritable nervous system of the pregnant woman.

Nausea and vomiting of pregnancy may last only a day or two, or may exist during the entire term of gestation. According to Giles, of London, who has made a careful study of the subject, vomiting may commence at any time after the first week till the end of pregnancy. Seventy per cent. of all cases of vomiting begin in the first month. Very few cases begin during the fifth and sixth months. The greatest amount of sickness exists in the second month.

Vomiting does not always occur during the first pregnancy, contrary to the statement sometimes made. In primiparæ the frequency of its appearance increases with age, so that 90 per cent. of primiparæ over twenty-five years of age are affected more or less. During the first and second pregnancies more patients are sick in the early months. In the later pregnancies a greater number are sick in the later months.

¹ Read at December (1897) meeting of Chicago Academy of Medicine.

Women who menstruate regularly and without pain, and not too freely, have less sickness than those who are troubled with profuse or painful menstruation.

Vomitus, or emesis gravidarum, may be divided into two chief classes, emesis gravidarum simplex and hyperemesis gravidarum (pernicious vomiting).

Hyperemesis gravidarum is the term applied to the condition when the patient rejects about all the food ingested, if she be around the house. In many cases of hyperemesis it will be found that some food is retained, if exact weights of the ingesta and ejecta are made, in spite of the fact that the patient seems to reject all the food taken. In milder stages of hyperemesis the patient may still retain carefully-selected food if she remain in the horizontal position. Hyperemesis gravidarum is divided by Dubois into three stages, and by Horowitz into two stages. It will be sufficient for our purpose to say that the later stages of hyperemesis are characterized by symptoms of starvation; that is, great emaciation and weakness, rapid pulse, with low blood-pressure, faintness, frequent syncope, scanty acid urine, with little or no chlorides, but with albumin, casts, and blood, increase in the specific gravity of the blood and increase in its alkalinity, obstinate constipation, and delirium. The temperature is also decreased from 1° to 4° , the same as in the later stages of starvation.

There are various possible ways of explaining vomitus gravidarum: (a) Direct vomiting may be produced by an abnormal condition of the vomiting-centre, due either to the irritating effects of chemical substances, toxins, etc., circulating in the blood, or to nutritional changes caused by variations in blood-pressure in the medulla, or to other circulatory changes. (b) Reflex vomiting may be produced by sufficiently powerful impulses sent from the genital tract, causing an irritation of the vomiting-centre. (c) Vomiting may be produced by a combination of influences affecting the vomiting-centre both directly and reflexly. The vomiting-centre may be made more irritable by circulatory poisons or by nutritional changes, and at the same time peripheral sources of irritation may be created by the same factors as act on the vomiting-centre, or by other co-operating factors. (d) Still another possible cause of vomitus gravidarum is the psychopathic factor, like that which exists in the vomiting of hysteria.

It was formerly supposed, and is still held by many, that reflex irritation from the genital tract was the only source of vomitus gravidarum. There was, however, a decided difference of opinion as to the part of the tract from which the irritation arose. According to some, among whom may be named Barnes, the irritation arose from the stretching of the uterine fibres due to the distention of the uterus by the growing egg. To this it may be replied that the uterus grows with the egg, and

we have no reason to think that there is any considerable intra-uterine pressure due to the too rapid development of the egg.

G. Hewitt, of London, was the enthusiastic supporter of the theory that vomiting was due to displacements of the uterus. He attributed greater importance to anteversion of the uterus than to retroversion, in accordance with the views of that time on the pathological importance of anteversion, which we now regard as a normal condition. An incarcerated, retroverted or retroflexed uterus is undoubtedly a cause of vomiting, as is illustrated by one of the cases that I shall present to you, but this condition is a rare one. There are often displacements of the uterus and no vomiting, while vomiting occurs very often when there is no displacement. The evidence in favor of his theory, which Hewitt drew from the success of his treatment by correcting the uterine displacement, has not been confirmed by others.

Irritation from the cervix has been a favorite theory of the cause of vomiting. The irritation is generally supposed to be due to very dense cervical tissue. This theory was thought to be supported by the results of Copeman's method of treatment, viz., dilatation of the cervix. It is singular that in some of the cases quoted by Copeman the cervix was not hard, but, on the contrary, soft and somewhat open, easily admitting the finger. The cervix is often hard when there is no vomiting. The Copeman method is not always successful, and the successes may be due to other reasons than its effects upon the cervical tissues. Kehrer assumes a similar theory of the cause of vomiting to account for the success of his treatment, which is simply a variation of the Copeman method, consisting in the gauze tamponade of the cervix. Davis found a tumor in the cervix in a fatal case of hyperemesis. This may have been a sufficient cause of reflex irritation in this case, as the incarceration of the retroflexed uterus is in other cases; but it would not prove that all cases are due to reflex action from the genital tract. Bennett long ago suggested that erosion of the external os, with inflammation of the cervix, was the cause of vomiting, and supported his supposition by the results of treatment applied to the os. While some cures followed this treatment it does not prove his theory, for many cases of vomiting occur where there is no erosion, and the results of the treatment may be explained in another way.

In opposition to the theories which consider the source of irritation to be in the cervix are those of Veit, Horowitz, and Tuszkai, who find the seat of the trouble in one or more of the coats of the body of the uterus. Veit finds endometritis, a condition leading to the hardening of a portion of the uterine wall, a frequent cause of hyperemesis. Horowitz, in his elaborate paper, expresses his belief that inflammation of the parenchyma of the uterus is the cause of the irritation. His proof is doubtful, and he also relates two fatal cases where the seat of the dis-

ease was in the stomach and in the intestine. Tuszkaï has recently renewed an old theory by assuming an irritation of the peritoneal coat of the uterus due to trophic disturbances following the growth of the uterus. He gives as a proof of this theory the success of his treatment by the application of ice to the abdomen.

All these theories of reflex vomiting are opposed by the theory of Kaltenbach that hyperemesis is due to hysteria. Excluding all cases which come from disease of the stomach, kidneys, heart, brain, etc., he makes the one element, hysteria, the sole cause of the disease. This position he supports by referring to the course of the disease and the effect of medicines. He points to numerous instances of the disease in neuropathic individuals, to the similarity of the disease to hysterical vomiting, and believes that the numerous strange and astonishing cures from such a variety of remedies were due to the effect of suggestion. Hysteria cannot explain all cases of vomitus gravidarum, for there are many cases in non-hysterical subjects; but it is no doubt a very important element in a large number of cases which must be included under the generic head of vomitus gravidarum.

The theory of direct vomiting due solely to irritation of the vomiting-centre can hardly be maintained. Toxinemias produced either by processes in the uterus or by changes in the general system as a result of the pregnancy, whether due to failure of renal elimination or to increased autointoxication, while they may be very important, as we shall presently see, could not alone account for vomitus gravidarum. General anæmia is often an important element, but is not always present. Local nutritional changes in the medulla, due to circulatory disturbances, are no doubt extremely important, and, while not alone sufficient, yet in connection with peripheral irritation, probably comprise one of the most efficient if neglected factors.

The remaining theory, that of reflex vomiting when there is an increased irritability of the vomiting-centre and peripheral irritation from a variety of sources, is one that must be accepted at the present time as the only theory that will account for facts and enable us to make of vomitus gravidarum a single disease. The causes of the pathological irritability of the vomiting centre may be circulating autogenetic poisons, or circulatory disturbances producing nutritional changes, or the unknown, and therefore undefinable, psychopathic or hysterical influence. The peripheral sources of the afferent impulses may be not only from the genital tract, but also from the stomach and intestines and from any other organ where changes due to pregnancy can lead to afferent impulses capable of affecting the abnormal vomiting-centre.

In many respects vomitus gravidarum possesses a remarkable similarity to seasickness. Indigestion and constipation are important elements in this sickness. Many would never be seasick if those causes were absent.

Yet we do not hesitate to say that one is seasick because he has gastritis or constipation; that is, seasickness includes all cases of vomiting at sea where the change in the vomiting-centre, caused by the motion of the ship, allows peripheral irritation to bring on the vomiting effort. Likewise, vomiting from constipation or indigestion in pregnancy is still vomitus gravidarum, since the peripheral irritation is sufficient only because of the increased irritability of the nervous system. It is, therefore, very difficult to make the distinction that is often attempted between vomiting in pregnancy and vomiting of pregnancy.

The increased irritability of the nervous system during pregnancy is a well-known and established clinical fact, as is shown by the changed mental condition, the disturbance in taste, sight, and hearing, and by the fact, recently observed by Neumann, of increase in the patellar and other reflexes. A common cause of these changes and vomitus gravidarum may be, as has been said, an autointoxication or a nutritional change due to disturbance in the circulation.

In considering the toxic theory our attention is first directed to the close similarity between vomitus gravidarum and eclampsia. The difference that in the latter disease the increased irritability of the nervous system leads to general convulsions instead of vomiting, only emphasizes the analogy of the diseases. While the nature of eclampsia is by no means entirely known, the experiments of Chambrelent, Ludwig and Savor, Volhard, and others seem to show an increase in the toxicity of the blood-serum, whether it be due to the presence in the blood of incompletely oxidized waste nitrogenous products, the predecessors of urea, or the products of nuclear decomposition, the xanthin bodies, or to increase in the fibrin ferment, or to some other agent.

Another disease of pregnancy only quite recently observed, viz., the peripheral neuritis of pregnancy, is also suggestive. First, Moebius called attention to cases of puerperal neuritis occurring within a short time after labor, where certain nerve-trunks were chiefly affected, especially the median and ulnar nerves, and suggested as a cause an infective poison. Then, when quite similar cases were found during pregnancy, Eulenburg attributed both to an autointoxication. Now, it is very interesting that those cases of neuritis gravidarum generally occur in cases of hyperemesis gravidarum, thus suggesting a common pathogenic element.

It may be objected that vomitus gravidarum begins, as a rule, in the earliest months of pregnancy, while an autointoxication would be expected only in the later months. Eclampsia is much more common in the latter part of pregnancy. Too few cases of neuritis gravidarum have been reported to form a basis for any statement concerning its frequency during the different months of gestation, but cases have been reported beginning early in pregnancy. Vomitus gravidarum is not

confined to the first half of gestation. Giles has found 45 per cent. of pregnant women not sick during the first three months, yet the acknowledged frequency of vomitus gravidarum during the first three months may not be against the theory of autointoxication. A quite recent discovery of hæmatoidin crystals in the intravillous space, as reported by Dr. Herzog, is suggestive in this connection. If their presence indicates the presence of blood outside of the endothelial lined blood-channels, as has heretofore been assumed, we have in the young placenta a very favorable condition for the introduction into the blood-current of abnormal blood products, for example, the hæmatoidin crystals, blood fibrin, etc.

Early intoxication is explained by Keiffer in his theory of menstruation and its relation to general pathology. According to this theory, menstruation is an eliminative secretion by the epithelial and gland cells of the endometrium, and its cessation during pregnancy causes an accumulation of toxins which produce the autointoxications of pregnancy. Without accepting this doubtful theory of the function of menstruation and the origin of the toxins of pregnancy, we can agree with Keiffer's conclusion that in the latter part of pregnancy the system becomes more or less accustomed to the poisons.

In regard to the nutritional changes in the vomiting-centre produced by disturbances in the circulation, it may first be noted that one of the earliest and, during the entire period of gestation, the most obtrusive symptom is the congestion of the pelvic organs. The remarkable circulatory changes which occur in the uterus, consisting in the formation of the large uterine sinuses and the intravillous space, seem to be accompanied with a general enlargement of the uterine, vaginal, urethral, and hemorrhoidal plexuses and, very probably, with a similar dilated condition of the entire abdominal splanchnic area. The result of the overfilling of this large blood reservoir is the relative anæmia of other parts, especially of the brain-centres. The similarity of this condition to that which exists in collapse or shock is at once suggestive. It is a chronic condition of low blood-pressure and anæmia of the brain occurring with or resulting from congestion of the splanchnic and pelvic areas, while shock is a similar acute or temporary condition produced in the same way. Without pursuing further the analogy of vomitus gravidarum to the symptoms of nausea and vomiting of shock, which our limited knowledge of the pathology of both diseases would not justify, I must rest content with the suggestion that the contributory influence of circulatory disturbance in producing an abnormal irritability of the vomiting-centre is a not unreasonable assumption. At the same time I will add that the overfilling of the pelvic vessels may be an important peripheral source of afferent irritative impulses.

The results of our discussion of the pathogenesis of vomitus gravi-

darum may be thus summarized: Neither a theory of reflex irritation from the genital tract, nor a theory of direct vomiting from irritation of the vomiting-centre, suffices to explain all the phenomena. We must assume that in two-thirds of all cases of pregnancy there exists an increased irritability of the medullary centres due wholly or in part to one or both of these two factors: (a) Nutritional changes resulting from circulatory disturbances, (b) poisoning from toxic elements circulating in the blood. We must further assume that this abnormally irritable vomiting-centre is acted upon by afferent impulses sent from one or more of a variety of peripheral sources. Among the most important causes of reflex irritation are an incarcerated retroflexed uterus, abnormal adhesions of the uterus, pathological changes in the uterine wall resulting from endometritis, pelvic congestion, constipation, gastritis, etc. To these sources of afferent impulses we must add the psychopathic or hysterical condition which is of especial importance in the more serious cases.

In the diagnosis of vomitus gravidarum the pathological conditions which have no connection with pregnancy, such as meningitis, traumatism, uræmia, hernia, etc., are generally easy to distinguish. The problem of diagnosis also requires the separation of the different sources of peripheral irritation. We thus have, outside of hysteria, the irritation outside of the genital tract, of the stomach, intestines, kidneys, peritoneum, and from the uterus, where the trouble may be from flexion, prolapse, endometritis, adhesions of the uterus, etc.

The prognosis in emesis and in the early stages of hyperemesis gravidarum depends chiefly on the possibility of instituting proper treatment. In severe hyperemesis the prognosis also depends on the seriousness of the changes in the vital organs as the result of starvation.

TREATMENT. *Prophylaxis.* The obstetrician is generally not called until the vomiting is quite severe. Prophylaxis here consists in preventing the graver forms. Advice can also be given for the benefit of future pregnancies. Such prophylactic management consists in the cure of anæmia, caring for digestible foods, the prevention of constipation, the correction of retrodisplacements of the uterus, and the cure of adhesions of the uterus as far as possible by massage. Especial attention should be given to the mental condition of the patient. The cases are particularly bad where a child is not wanted. Those patients who have no self-control are the most serious cases.

It will be seen from this that treatment, to prevent vomiting of pregnancy, should begin with the birth of the girl, as suggested by Giles de la Tourette when speaking of hysteria. Like the prophylaxis in hysteria, the entire education of the child is important. Later, the masterful but kind bearing of the obstetrician is one of his most important aids. Rules of hygiene are especially important; regular eating

and bathing, proper clothing, suitable exercise, enough sleep, and massage, if necessary, are all to be attended to. Often account should be taken of the reading and amusements of the patient.

Treatment of mild cases of vomitus gravidarum. The hygiene and general management, such as described in prophylaxis, are here about all that is needed. A proper condition of the bowels must be secured by the use of fruit, saline laxatives, enemata, and abdominal massage. The patient should take a cup of hot milk half an hour before arising in the morning. These measures will, in the majority of cases, prove all that is needed and a very great help.

Treatment of hyperemesis gravidarum, except the extreme cases. The indications are, first, to allay excessive irritability of the nervous centres. Second, combat the neuropathic condition, hysteria, by strengthening the will. Third, remove the source of peripheral irritation.

The abnormal irritability of the central nervous system, which especially interests us, may be due to the deranged nutrition or to intoxication. In any case it is best allayed by providing a steady circulation of the blood with an equable blood-pressure, and good elimination by the intestinal and renal emunctories.

For maintaining a proper intracranial circulation the horizontal position is necessary, and this measure alone is the most important of all things in treating the vomiting of pregnancy, as it is in the allied condition of seasickness. The position must be constantly and persistently maintained. It is often desirable to have the head lower than the feet. All nourishment must be given without raising the head. During vomiting the patient must be turned on the side, and on no account be raised. These details are so important, and yet so often neglected, that they must be emphasized and often repeated. Absolute rest in the horizontal position also serves another important purpose, viz., it insures against unnecessary loss of strength and vital energy. In extreme cases the dangerous symptoms and the fatal results are from inanition. When there is no fresh supply of food the body has a limited store of energy, and when the usable amount, which comprises less than one-half the body-weight, is consumed the patient must die; hence it becomes very important to restrict the amount of energy consumed and avoid all waste from unnecessary movements until the possibility of a new supply is established. Just as a starving person can live longer if he remain absolutely quiet than if he make violent muscular exertion, so a vomiting grvida conserves her vital energy by remaining in the horizontal position.

Other ways of maintaining a normal circulation consist (a) in stimulating the cutaneous capillary circulation by topical applications, and (b) in hypodermatic injections of stimulants and vasomotor regulators, and (c) in injection into the diminished blood-current of artificial serum,

either through the intestinal or subcutaneous route. Peripheral vascular stimulation secured by sinapisms or by the hot-water bag to the epigastrium or to the feet will, of course, not be neglected. Warm clothing to prevent cutaneous capillary obstruction, as well as to preserve the heat and energy of the body, will be looked after.

The use of drugs which act on the circulation is not unattended with risk, because of unpleasant action on other organs of the body. Nuxvomica or strychnine may be one of the most valuable of these agents. Whether the bitter stomachics, including the recent and now popular orexinum basicum, so warmly recommended by Frommel, Rech, and others, act on the circulation or locally on the stomach, is not, so far as I know, determined.

The value of intravenous or subcutaneous injections of salt solution in raising the blood-pressure and stimulating the circulation is now well established. In all obstetric cases I believe the subcutaneous injection may be substituted, with advantage, for the intravenous injection. In the hypodermatic injection there is no danger of the introduction of air into the bloodvessels, and the constitutional symptoms of chill, etc., which often follow intravenous injections are absent; moreover, the former method is much simpler and can be carried out by any one, while the latter is a surgical operation of some difficulty.

The value of artificial serum in restoring the vascular pressure after severe hemorrhage, and thus counteracting its serious symptoms, has long been known. Its more recent use in sepsis has been based on the theory that it washes out the toxins in the blood. During its employment in these cases, however, its effect on the blood-pressure has been especially noticed. As is well known, in severe cases of sepsis the pulse becomes rapid and soft, and the patient suffers from symptoms of weakened circulation as well as intoxication. It is in this condition that the *lavage de sang* exhibits its best effects, so that Tuffier, one of the most enthusiastic and diligent employers of this method, suggests that its chief value may consist in its effect on the circulation instead of its supposed action as a means of washing the blood.

If the abnormal irritability of pregnancy be due to intoxication the need of thorough elimination is apparent. This elimination is secured in ordinary cases by careful attention to the skin by means of baths and proper clothing, by preventing constipation, and by furnishing the system as much water as possible to aid the renal excretion. In hyperemesis gravidarum the urine becomes very scant. Here the subcutaneous salt solution acts very promptly and efficiently, as will be seen from the cases that I shall presently report.

Nerve sedatives can be used in hyperemesis gravidarum only with great caution. If morphine is used quite large quantities must be em-

ployed, and its effects have seemed to me to be in general bad. Chloral has cured two cases for me that no other drug had helped.

As before stated, it has already been shown by Kaltenbach and Ahlfeld, and many others, that the neuropathic condition is a very common and important element in the causation of hyperemesis gravidarum, and must be taken account of in its management. While it cannot be admitted that hysteria is the sole cause of the disease, it is very essential to remember that it has an influence in many cases where, upon superficial observation, it would not be suspected, and that in other cases where no true hysteria exists some neuropathic condition, inherited or acquired, is one of the causative factors to be reckoned with. Hence the entire examination and treatment should proceed with this fact in view, in order that the proper psychical influences necessary to a successful control of a neuropathic patient may be obtained. In the management of these hysterical cases it is often best for the obstetrician to plainly inform the patient that the control of the vomiting is possible by an exercise of the will, and insist that she make the effort. Chazan reports a serious case to which he was called to induce abortion, which he successfully managed in this way. In many cases suggestion has been employed. Terrien reports a cure from the suggestion that the six-weeks' fetus had been removed, showing the patient a flake of mucus from the vagina. Doléris reports three cases cured by electricity when no current existed. These cases might be multiplied from the literature, but they are sufficient to show the possibilities of this method of management. It is also probable that many cases reported cured by the various methods of uterine treatment, by stomach lavage, by electricity, etc., are cases of cure by suggestion. Muret reports a cure which he attributed to suggestion after one lavage. As his patient had suffered from gastritis before pregnancy, it might not be possible to ignore the local effect of the treatment. It is, however, very likely that many of the cures from Copeman's dilatation of the cervix, from cauterizing the external os uteri with nitrate of silver, from the use of electricity, etc., are due simply to suggestion. Hence, in planning the course of treatment of a case of hyperemesis gravidarum it is very important to examine the patient very carefully to determine the presence of an hereditary tendency to hysteria, and to search for hysterical stigmata. Having found a neuropathic element, we should not neglect the well-established principle of treatment of hysterical patients. The most important measure is separation from friends and relatives. In these cases they form the worst possible nurses. Let the patient be isolated under the care of an intelligent nurse experienced in these cases, and be subjected to a régime consisting of frequent feedings, massage, baths, etc. Such a course does not overlook the possibility of a complication

with some reflex disturbance from a peripheral irritation, which should, of course, be attended to.

If the examination has shown the presence of a peripheral irritation, either as the only recognized cause of the vomiting, or as a complicating factor with hysteria, the treatment indicated is the removal of the irritation. One should not forget that pathological conditions in the gastrointestinal tract may be a source of reflex vomiting. Physical examination of the abdomen will often reveal the presence of hard fecal masses in the ascending or descending colon, or in both. Our first effort will naturally be to remove them by large enemata, combined with massage. A number of cases have been reported where cancer, or stricture of the pylorus, or phlegmonous gastritis has been found. Yeast-cells are often abundant. In pathological conditions lavage is indicated. In a case that I saw the stomach was the seat of excruciating pain, which had led the patient to take large doses of morphine. I am inclined to regard this pain as a hyperæsthetical stigma of hysteria. For such a case a local ice-bag is indicated.

When a pathological condition is found in the pelvis it should be corrected if possible; a retroflexed uterus should be replaced and held in place by a pessary. But little can be done for adhesions of the uterus to neighboring organs if first discovered in pregnancy. An eroded os can be touched with silver nitrate, more for the moral effect on the patient than for its use in curing the lesion. Copeman's dilatation should be used with great care, if at all, with the same object in view.

It has already been suggested that the congestion of the pelvic and splanchnic area veins may not only be an important cause of disturbance of the medullary centres, but also act as a source of powerful reflex irritation. In this case any measure already suggested to relieve the circulation will tend to relieve this congestion. In addition to these measures, the application of an ice-bag over the hypogastrium is worthy of trial.

Under the plan of treatment thus outlined most cases that have not advanced to the last stages of starvation can be controlled. It now becomes necessary to consider those cases in imminent danger of death from inanition, and to discuss the frequently employed procedure, the induction of abortion or miscarriage.

The results of abortion are not encouraging. Cohnstein's statistics embrace 200 cases, in only 40 per cent. of which did vomiting cease after abortion. The death-rate is very high. Abortion is generally performed so late that it adds much to the danger of the patient, and if done early it is probably unnecessary. I will add to the casuistic three fatal cases where abortion failed to check vomiting and probably aided materially in the fatal issue. The first case was complicated with sepsis from the bladder, and, perhaps, should hardly be classed with the

other cases, but for its bearing on the causation it is included. In the other cases the futility of the operation is well shown.

CASE I. *Vomitus gravidarum due to incarceration of retroflexed uterus; retention of urine, with decomposition; sepsis; induction of abortion; death.*—The case occurred in my service in Cook County Hospital several years ago. The patient was about five months pregnant, and had suffered for the last two months from the consequences of an incarceration of a retroflexed uterus, one of which was constant vomiting. Upon her admission she had a high fever, rapid pulse, and was emaciated to a high degree. The bladder was greatly distended with urine that had undergone alkaline fermentation. Upon vaginal examination the cervix could not be reached, so high was it raised above the symphysis. After removing the urine it was impossible to get hold of the cervix or to dislodge the fundus, and I found it necessary to drain off the liquor amnii with a trocar introduced through the posterior wall of the uterus. Then the cervix was rapidly dilated and the foetus removed. The patient never recovered fully from the shock of the operation, and died about fifteen hours after.

CASE II.—Mrs. T., aged about thirty years, a rather small, quiet person, not hysterical. Vomiting began early in pregnancy, and in a few weeks became uncontrollable. I first saw her about the twentieth week. She was weak and emaciated, and vomited whenever she took any food or drink. By vaginal examination the head of the child was found in the pelvis behind the cervix. The examination gave the impression of a kind of hernia of the uterus through the posterior segment of the pelvic floor. Several drugs were employed and various foods used, but in vain. After two or three weeks—i. e., in about the twenty-third or twenty-fourth week of gestation, miscarriage was induced. A bougie was first introduced and, later, the cervix was dilated with a Braun colpeurynter. It was about eighteen hours from the introduction of the bougie to the completion of labor. After the operation there was no cessation of vomiting. She lived four days, and until a few hours before death the temperature was subnormal. Then there came a fever, whether of infectious origin or not, I did not determine.

CASE III.—Mrs. G., aged about thirty-three years. Normal weight about 112 pounds. Both father and mother and brothers and sisters are neurotic. The mother has nervous attacks. The patient had a very severe attack of gastritis, with uncontrollable vomiting, which lasted over a week before the third pregnancy. The first pregnancy terminated at eight months in the birth of a dead child. The second pregnancy terminated at six months. During the third pregnancy, which terminated at five months, there was the usual vomiting. The fourth pregnancy occurred two and a half years ago. About the end of the second month vomiting began, which soon became pernicious. Nothing was retained. Medicines, lunar caustic to the cervix, and Copeman's dilatation were used in vain. About three weeks after vomiting began abortion was induced. Rectal feeding was employed for two or three days, and then food was given by the stomach. The fifth pregnancy commenced in the spring of 1897. Vomiting began at the end of the second month, more pernicious than before. The same treatment was employed as before, but in vain. Two weeks after the beginning of the pernicious vomiting abortion was again induced by the method of rapid

dilatation and emptying of the uterus, with the patient under ether. This time, however, the vomiting did not cease. Three days after the operation fever began. At this time I was called in. In spite of lavage vomiting continued. The fever continued, and two days later, five days after the operation, the patient died.

The unfortunate termination of the last case was probably due to sepsis, and it well illustrates the grave danger of infection in these cases of lowered vitality. The fatal issue in the second case was probably hastened by the exhaustion following the operation, although the fever may have also indicated an infection.

The unfortunate influence of abortion is seen in reports of the numerous cases scattered throughout the literature. Those who most strongly recommend the induction of abortion warn against its employment in the last stages. The waste of energy from the shock and loss of blood is often enough to hasten the death. But the necessity of abortion at an earlier stage is made doubtful by such testimony as that given by Frank, former assistant of Schauta, in Prague. According to Frank, Schauta in all of his great experience has never seen the need of inducing abortion. He succeeds by using a milk diet, horizontal position, and general hygienic measures.

I believe there is no place for abortion in the treatment of hyperemesis gravidarum. When it is efficient it is unnecessary and much more dangerous than other measures, besides sacrificing the child's life, while in the later stages it hastens death.

As a measure for use in desperate cases, I wish to recommend a mode of treatment for which I have great hopes. It is the use of subcutaneous injections of salt solution. I have employed it in only one case, where the immediate results were very satisfactory, but where the succeeding complications interfered with the value of any conclusions that might be drawn.

CASE IV.—Aged about twenty-eight years, small, nervous, from a neuropathic family. A few years before she had had convulsions of a tetanic character. Vomiting began shortly after the beginning of pregnancy, and soon became quite common. After three or four weeks emaciation became great. The stomach-contents were expelled and found to contain large quantities of yeast. The patient had very severe epigastric pains, for which morphine hypodermatically was given. About five weeks after the vomiting began, in about the ninth week of pregnancy, I was called in. The fact of pregnancy was established by the enlargement of the uterus and the presence of colostrum in the breasts. The patient retained nothing except a small amount of egg-albumin. The fat was gone, the muscles wasted away, the pulse weak and rapid, the temperature subnormal, the urine thick and very scanty. She sat or crouched in bed with her chest bent on to the knees on account of the epigastric pain. I recommended her to be taken to the hospital and given one quart of normal salt solution hypodermatically

twice a day, and have the stomach washed out every morning. In addition she was to have rectal injections of salt solution three or four times a day. This line of treatment was instituted with excellent results for two days, when, unfortunately, it was interrupted. The vomiting ceased after the second injection, and she was able to retain nourishment and continued thereafter to take several glasses of milk a day. The urine increased from six ounces per day to twenty-four ounces. The treatment was interrupted by the resistance of the patient, who was made worse by the presence of a cellulitis in the neighborhood of one of the injections. This is the first instance of infection following an injection that I have had, and I have used the subcutaneous injections in obstetrical practice quite extensively for the past year. As the patient insisted on returning to her home after remaining in the hospital three days and receiving four or five injections, I lost track of the case for a short time, when I was called with the shocking report that she had an attack of tetanus. I found that she had taken considerable nourishment since leaving the hospital, and had apparently gained in strength. She had had at home three or four small injections of salt solution; four or five hours before I saw her the jaw became set, and finally a typical general tetanoid spasm had occurred. On account of the previous history of similar attacks, I hesitated to make a diagnosis of true tetanus, but the rapid progress of the case, with typical tetanic convulsions increasing in frequency and severity, settled the diagnosis. Thereupon I injected 30 c.c. of antitetanic serum, furnished by the Pasteur Company, and repeated the injection in four hours. Morphine was given hypodermatically. The inflamed area around the injection was lanced, securing a very small amount of serum, which was collected in a sterile bottle and sent to Dr. Herzog, of the Chicago Polyclinic Laboratory. Cultures were made by the pyrogallic method, but no tetanus bacilli were found. The serum injected had no effect on the patient; the convulsions increased in frequency, and she died about twenty-four hours from the first appearance of the tetanus. I may add that injections of the stomach contents into two rabbits caused their death in violent convulsions.

Whether the point of entrance of the tetanus infection was the injection area or not, the occurrence of this accident—*i. e.*, the infection of the injected area—cannot be blamed to the method any more than an infection occurring after a hypodermatic injection of morphine could be given as an objection to hypodermatic medication in general.

The effect of the injection was too immediate and too great to be above suspicion, and might well lead to the surmise that it was only another instance of the effect of suggestion on an hysterical patient. Against this I can only say that similar instances of the remarkable immediate effects of saline injections are constantly met with in using them in hemorrhage and sepsis. A septic patient with a severe headache or dizzy and faint loses her headache and faintness before the injection is completed. These immediate effects are due to rapid elimination of poison and to improvement of blood-pressure. A saline solution acts not only as an eliminant by increasing the blood-pressure, but also as a food. It furnishes the system in a state of starvation two most

essential elements, water and chlorides. It is well known that a fasting person who drinks can live considerably longer than one who neither eats nor drinks. The chlorides are also an essential element of the system and one that disappears early in starvation. Hence it seems very important to exhibit a saline solution as a food which enables us to gain time and keep the patient alive till other food can be introduced and retained in sufficient quantities.

Since using the solution in the case reported I have discovered that it has also been used in France for the same purpose by Durdan Laboric in Cheran's clinic at St. Lazare. The case was that of a patient, aged twenty years, in the sixth week of pregnancy. Complications present were gonorrhœa, prolapse of the uterus, and erosion of the os. The blood tension was 40, pulse 100, and there was frequent syncope. A large injection of salt solution was given every day, but still vomiting continued. Then an ichthyol-glycerin tampon, with resorcin and cocaine, was applied to the os. For twenty-two days very little was retained except the salt solution, when the vascular tension had increased to 70. Improvement was now rapid, but the injections were continued two months longer, when the vascular tension had increased to 160, and the patient was in a good condition.

This is a very good case to illustrate the relative value of the saline injection and induction of abortion. The existence of gonorrhœa would have made artificial abortion very dangerous, while the use of the injection furnished a way to save both mother and child.

In closing, to briefly sum up the suggestions regarding treatment, we would say: 1. The abnormal irritability of the nervous system, including the vomiting-centre, is to be allayed by keeping the patient in the horizontal position, by attention to the skin and bowels and kidney, using rectal and, if necessary, hypodermatic injections of salt solution.

2. The hysterical condition which is so commonly found present should be controlled by strengthening the will and influencing the dominant ideas of the patient.

3. All sources of peripheral irritation should be discovered and treated.

4. In extreme cases subcutaneous saline injections serve the threefold purpose of (a) dilating the blood and increasing vascular tension, (b) eliminating toxins through renal and intestinal excretories, (c) furnishing two most important kinds of food.

5. Induction of abortion is never indicated. At a stage when it is safe and efficient it is not necessary, and in extreme cases it adds greatly to the danger, rarely stops the vomiting, and can be substituted by the artificial serum.

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THE SHAPE OF THE STOMACH.¹

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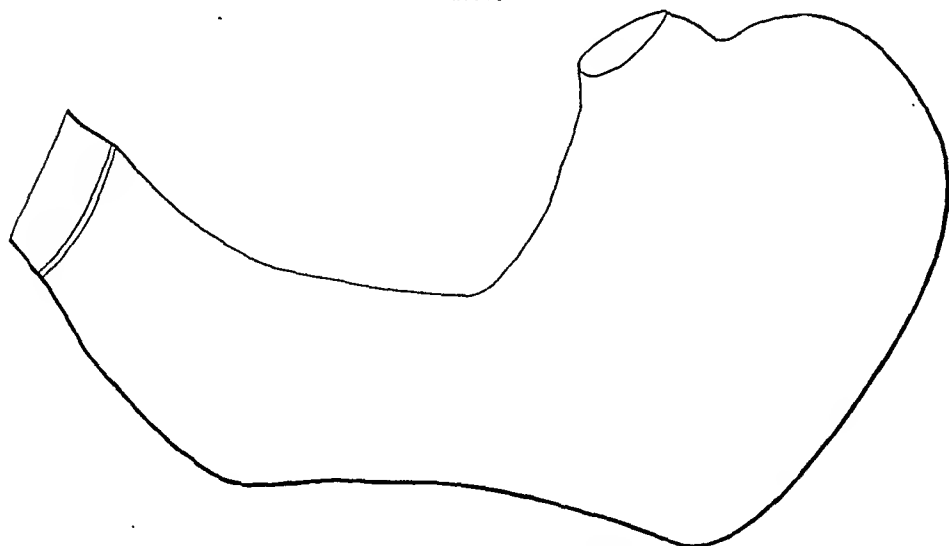
THE object of the present investigation was to review some of the generally accepted facts concerning the anatomy of the stomach, and to

¹ Paper read before the Academy of Medicine of Cincinnati, December 21, 1896.

see what light a study of the gross anatomy of the stomach might throw upon its physiology. The work was done conjointly by Dr. William H. Crane and myself; the photographs are by Dr. Crane.

The need of a general review of the text-book statements concerning the anatomy of the stomach is apparent to any one who will take the trouble to read the widely diverging accounts of different authors, and in these, as in other fields of medicine, mistakes have been handed down from author to author without personal investigation. The present study deals chiefly with *the form of the stomach*; our method was to inflate the stomach with air by means of a hand-bellows or bicycle-pump, and then allow the stomach to dry in the air. This method has the disadvantage that the amount of inflation is not always uniform in different stomachs, and that a very slight amount of shrinkage occurs as the stomachs dry; but the errors from these sources are so small that they may be disregarded. A number of stomachs were dipped into formalin, or preserved in a solution of chloral hydrate before inflation, but neither of these methods gave quite as satisfactory results as the one employed. Some of the foetal stomachs were preserved in alcohol, where some shrinkage may have occurred, but the general shape and proportions of the stomach were not altered thereby.

FIG. 1.



Adult stomach of cylindrical shape.

The general shape of the adult stomach is too well known to require special description here. The part to the left of the cesophageal opening is called the fundus; and that part which lies nearest the pylorus is termed the antrum pylori. The right half of the stomach is often called the pyloric half; that to the left the cardiac half. In general, the stomach may be said to be pear-shaped, the large end of the pear being represented by the fundus.

No organ of the body varies so much in form as the stomach. None of the patients from whom these specimens were obtained had special stomach trouble, as far as is known. Yet, a glance at the specimens presented will show a variety of types.

In one the cylindrical type is approached, the stomach appearing like a long-drawn-out tube (as in this card specimen copied from life). (See Fig. 1.)

In another, the vertical diameter, which usually is a little less than half of the long diameter, falls short of the long diameter by only a few centimetres. In one, the fundus may be nearly one-half the length of the stomach; in another the fundus may be almost altogether wanting, or scarcely one-fourteenth the total length of the stomach (see Fig. 2). The form of the curvatures also varies considerably. The lesser curvature may be almost a straight line (as in the specimen before you), or it may form a deep curve.

FIG. 2.



24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41

Adult stomach without fundus.

One might be led to ascribe these variations of form to the manifold forces acting during life, such as the amount and character of ingesta, the tonicities of the abdominal walls, the intra-abdominal pressure, the permeability of the pyloric orifice, etc., but it is doubtful if any of these conditions has any influence *normally* in controlling the shape of the stomach. Reference to the specimens of foetal stomachs (which I here present) will show that the same differences in type occur in intra-uterine as in adult life.

These two specimens (see Figs. 7 and 9), taken from foetuses of respectively four and four and one-half months, are examples of the cylindrical stomach; whereas the next two (see Figs. 4 and 8), taken from foetuses of respectively three and four and one-half months, are types of deep stomachs.

FIG. 3.



FIG. 6.



FIG. 9.

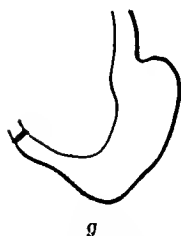


FIG. 4.

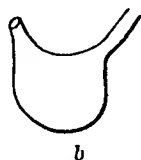


FIG. 7.

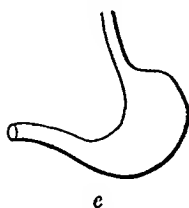


FIG. 10.

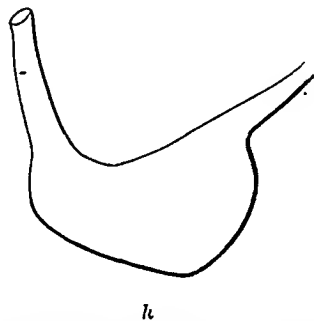


FIG. 5.



FIG. 8.

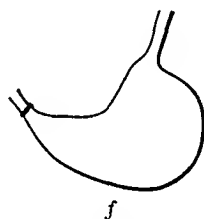
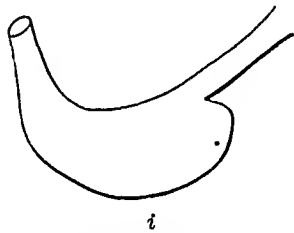


FIG. 11.



Stomachs of human foetuses inflated with air and preserved in weak alcohol.

a. Foetus eleven weeks old. b. Foetus three months old. c. Foetus three months old. d. Foetus three and a half months old. e. Foetus four months old. f. Foetus four and a half months old. g. Foetus four and a half months old. h. Foetus six months old. i. Foetus four and three-quarters months old.

The development of the fundus is subject to like variations in foetal life. In this very small stomach, taken from a foetus of about eleven weeks, the fundus is 40 per cent. of the length of the whole stomach (Fig. 3), whereas in this stomach of a six months' foetus, the fundus is but 11 per cent. of the total length (Fig. 10). The form of the adult stomach, therefore, probably depends on the embryological shape, and the causes which affect this are beyond our observation. The shape of the stomach in different individuals differs as ears differ; and is not due ordinarily to post-natal conditions.

It may surprise many of my readers to hear of the fundus of foetal stomachs. No statement is more harped on in text-books of anatomy and paediatrics than that the fundus of the stomach is absent, or but

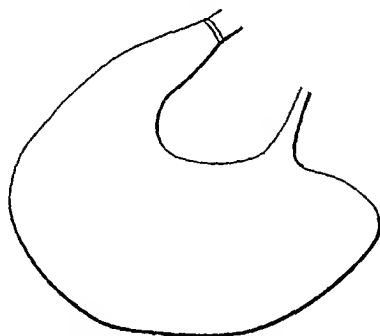
little developed, in foetal and infantile life. This statement is copied from one book to another, and I know of no fallacy which has taken deeper root in the minds of physicians and anatomists. I have nowhere been able to find a correct statement of the facts, namely, that the fundus is as well developed in infants as in adults, and that the cylindrical form of the stomach and the absence of the fundus in infants and foetuses are wholly mythical.

Dr. Lesshaft's views (as quoted in Gray's *Anatomy*), that the development of the fundus is due to the course of the food in the stomach, assume rather a fantastic character when we consider that the fundus is practically as well developed in a foetus of three months as in an adult. Even the German anatomists Henle¹ and Hyrtl² speak of the lack of development of the fundus in foetuses and infants. Sidney Martin,³ in his recent book, does not hesitate to say that "at birth the fundus is absent."

The authors on diseases of infancy all make the same misstatement; and the belief is almost, if not quite, universal in the profession that vomiting in infancy is due in part to the cylindrical form of the stomach and the lack of development of the fundus.⁴

Reference to the specimens presented will show what little foundation these statements have in fact, and it will be noted that the youngest foetal stomachs obtainable for demonstration (from three months on) have well-developed funduses and are not more cylindrical in form than

FIG. 12.



Stomach of an infant at term.

adult stomachs. I have made exact measurements of nine foetal stomachs from the third to the sixth month, of seven stomachs from infants and children varying in age from one day to five years, and of eleven adult stomachs, and present the measurements in tabular form:

¹ Henle: *Handbuch d. systematischen Anatomie*, 1866, II. p. 163.

² Hyrtl: *Handbuch d. topogr. Anat.*, Wien, 1853, p. 424.

³ Martin: *Diseases of the Stomach*, 1895, p. 2.

⁴ See Jacobi: *Therapeutics of Infancy and Childhood*, 1896, p. 25. Henoeh: *Vorlesungen über Kinderkrankheiten*, 1890, p. 117. Louis Starr: *American Text-book of Diseases of Children*, 1894, p. 9.

MEASUREMENTS OF NINE FETAL STOMACHS.

Age of the embryo.	Length of fundus in cm.	Length of stomach in cm.
11 weeks	0.22	0.55
3 months +	0.4	1.1
3 months +	0.4	1.3
3½ months +	0.3	1.4
4 months	0.5	1.5
4½ months	0.5	1.8
4½ months	0.35	1.8
4¾ months	0.35	2.3
6 months	0.3	2.6
Average length of fundus	0.378 cm.	
Average length of stomach	1.59 "	
Average proportion of fundus to total length, 23.6 per cent.		

MEASUREMENTS OF SEVEN STOMACHS TAKEN FROM INFANTS AND CHILDREN.

Age of the child.	Length of fundus in cm.	Length of stomach in cm.
4 hours	1.3	4.6
1 week	1.4	6.5
2 months	3.0	7.6
15 months	3.5	9.7
3½ years	7.3	16.3
4½ years	7.7	16.0
5 years	4.5	16.5
Average length of fundus	4.10 cm.	
Average length of stomach	11.0 "	
Average proportion of fundus to total length, 37.2 per cent.		

MEASUREMENTS OF ELEVEN ADULT STOMACHS.

	Length of fundus in cm.	Length of stomach in cm.
1	7.0	24.0
2	9.0	29.5
3	13.0	27.0
4	7.8	24.0
5	5.5	23.0
6	5.0	21.0
7	6.0	25.5
8	4.5	23.5
9	1.5	20.0
10	4.8	23.5
11	9.4	26.0
Average length of fundus	6.68 cm.	
Average length of stomach	24.2 "	
Average proportion of fundus to total length of stomach, 27.5 per ct.		

In the nine foetal stomachs the average proportion of the length of the fundus to the entire length of the stomach is 23.6 per cent. (varying from 11 per cent. to 40 per cent.).

In the eleven adult stomachs the average is 27.5 per cent. (varying from 7.5 per cent. to 48 per cent.). In the seven stomachs of infants and children the average is 37.2 per cent.¹ Thus it would appear that the fundus reaches a higher proportionate development in infants and young children than at any other period of life. At all events, these figures prove beyond question that, respecting the development of the fundus, the statements made in the text-books are false; and one need but look at the specimens of the infantile stomachs to note that they are not more cylindrical in form than the adult stomachs.

FIG. 13.



Stomach of a three-year old child, showing the asymmetrical insertion of the oesophagus.

The methods of preparing stomachs by inflation of air led to the discovery of an anatomical feature which we find nowhere in the literature. If you look at an inflated stomach from above downward you will note that the oesophagus does not enter the stomach at a point equidistant from the anterior and posterior surfaces of the stomach. The cardiac orifice is invariably much nearer the anterior than the posterior wall (Fig. 13). This eccentric insertion of the oesophagus is so uniform and, in most cases, so striking, that it is very strange that the fact has not

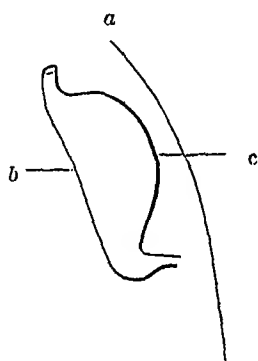
¹ Since the above was written I have examined more than one hundred additional stomachs of all ages, and have the exact measurements of more than double the number here given. The percentages are: for adult stomachs 29.6 per cent., for infantile stomachs 35 per cent., and for foetal stomachs 27 per cent.

been noticed hitherto; but all the text-books of anatomy are silent on this point. This asymmetry of insertion is constantly present, occurring in all the stomachs, both foetal and adult, that we have examined; but it varies considerably in degree. In general it may be stated that about two-thirds of the fundus lies behind the cardiac orifice, and one-third in front. References to the specimens presented will show, however, that in some stomachs the asymmetry is only slight, in others it is excessive.

An explanation of this anatomical peculiarity may be found by attention to the development of the stomach. Originally, of course, the stomach is a simple tubular prolongation of the oesophagus. In human embryos of the sixth week the form is no longer cylindrical.¹

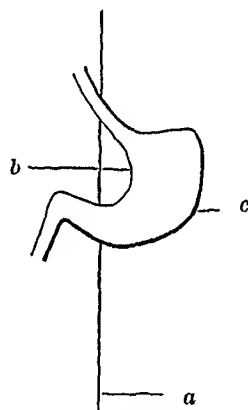
The posterior surface of the tube (that directed to the spinal column) bulges considerably (greater curvature); the anterior surface is slightly depressed (lesser curvature). During the third month the stomach undergoes decided change in position (Figs. 14 and 15). In the first

FIG. 14.



Position of the stomach in a human embryo of six weeks. (After TOULDR.) a. Spinal column. b. Lesser curvature. c. Greater curvature.

FIG. 15.



Change in the position of the stomach during the third month of foetal development.

place it twists on its sagittal axis in such a manner that the long axis of the stomach instead of lying parallel with the spinal column thereafter lies obliquely, the fundus thereby moving to the left of the median line, the pylorus to the right.

In the second place, a twist occurs in the long axis of the stomach and lower part of the oesophagus in such a way that what was the left side becomes the anterior one, what was toward the right turns backward. Owing to the more rapid development of the posterior part of the tube, the cardiac orifice assumes a position nearer and nearer the anterior surface of the stomach. In human embryos of three and four months this asymmetry can be clearly seen, and becomes more and more marked, reaching its maximum in early childhood. It is right to assume, there-

¹ Hertwig: Lehrbuch der Entwicklungsgeschichte, 1890, p. 252.

fore, that the posterior portion of the fundal half of the stomach grows more rapidly than the anterior portion from a very early period in embryonic life until the first few years of life have been passed, and that afterward this disparity, though still continuing, is less marked.

If you glance at a normal, inflated stomach you will usually find, about two or three inches from the pylorus, a more or less well-marked indentation on the greater and, less commonly, the smaller curvature of the stomach. Between this indentation and the pylorus there is usually a slight bulging of the walls of the stomach. This condition corresponds to the dilatation that occurs on the proximal side of every stricture or constriction; and in the case of the stomach is possibly due to the pressure of the food before the opening of the pyloric valve permits its egress. In some cases of narrowing of the pylorus this bulging is very marked; it is also extensive in many instances in which no obstruction at the pylorus exists. On the post-mortem table another constriction is often found which has given rise to much conjecture. This constriction occurs usually about the middle of the stomach, and often extends from there to the pylorus, causing the pyloric half of the stomach to resemble the transverse colon in contour. Sometimes the constriction is more limited in extent, and seems to divide the stomach into a right and left half. Henle attributed this appearance to post-mortem rigidity, but this does not explain the condition fully. Early in this century Sir E. Home¹ noted that this appearance was most commonly met with in those who had died during the act of digestion, and he inferred that the constriction of the pyloric half of the stomach is a natural physiological movement during digestion. Brinton² states that he actually saw this constriction in dogs during digestion. Beaumont also, in his experiments on Alexis St. Martin, found that any hard substance was taken up firmly by the muscles of the pyloric half of the stomach and moved with force toward the pylorus. Sir E. Home and Brinton both inferred from their observations that the functions of the two halves of the stomach differed; and that the function of the pyloric half was chiefly mechanical, that of the cardiac half chiefly chemical. At all events, the constriction we have mentioned is usually only temporary, and disappears spontaneously when the contracted muscles relax, or is effaced when the stomach is inflated.

In some cases, however, the constriction is permanent, and actually divides the stomach into two halves, giving rise to what is called the "bilocular" or "hour-glass" stomach. All the older anatomists, from Morgagni down, have noted the existence of these "hour-glass" stom-

¹ Philos. Transactions of the Royal Society, London, 1807, pp. 170, 171.

² Medical Gazette, 1849. See also his Diseases of the Stomach.

achs, and almost all the large museums have one or more specimens of this peculiar condition. No one, as far as I know, has collected all the cases of hour-glass stomachs reported in the literature, but their number is about one hundred. I shall pass about traced drawings of some of the reported cases which give a good idea of all the various types.¹

I have the pleasure, in addition, of presenting a specimen of a bilocular stomach in which the constriction is not as marked as in most cases. The patient, as far as is known, had no symptoms referable to the stomach. I present also a photograph of a specimen which showed a peculiar constriction much nearer the pylorus. This constriction appears to be due to an exaggeration of the normal indentation usually found in this situation and referred to above.

The real significance of the hour-glass stomach has given rise to some conjecture. The deformity at once calls to our minds the fourfold stomachs of the herbivora and the bilocular stomach of rodents, and suggests that possibly in the human being the two halves of the stomach, though not separated anatomically, may, nevertheless, play different rôles in digestion. As a matter of fact, the cardiac portion differs materially in very many ways from the pyloric portion. As is well known, the peptic glands are found almost exclusively in the cardiac pouch, and the production of acid is limited to this region. The pyloric region, on the other hand, is lined almost wholly with mucous glands. The post-mortem digestion of the stomach occurs in the cardiac, not in the pyloric part of the stomach. The muscle fibres of the cardiac half are few, scattered, and not gathered into bundles. In the pyloric half, on the other hand, the muscles form strong bundles, are more numerous and regular in arrangement. If you lay open a human stomach along the greater curvature, you will find that the rugæ of the mucosa are transverse in the fundus, but in the pyloric region they are parallel with the long axis of the stomach. Now, this arrangement corresponds exactly with the condition in the two halves of the rat's stomach, and suggests a difference in function in the two halves of the human stomach.

Our discussion of this subject may pass out of the bounds of mere inference and may be based on actual observation. We know now that the resorptive functions of the stomach are very slight; that with the exception of a little pepton, alcohol, and salts, very few substances pass through the walls of the stomach into the circulation. We know also that the digestive function of the stomach is of no great importance, and may be dispensed with altogether. If the stomach is not necessary

¹ These congenital hour-glass stomachs must be carefully distinguished from stomachs deformed by the cicatrization of ulcers. In this class of stomachs the seat of the ulcer is always the centre of radiating scars and puckerings, and the stomach is usually adherent to neighboring viscera. In the congenital form, though ulcers commonly exist in the mucosa, both the peritoneal and the mucous surfaces at the seat of the constriction are perfectly smooth.

for digestion, if it is not used to any great extent for the absorption of food, it must serve chiefly for a receptacle of food and water. It may, with some confidence, be asserted that the chief functions of the stomach are to mix the different foods thoroughly, to equalize their temperature, to destroy bacteria, to dilute the food properly, and then to transmit it at proper intervals into the intestine. Hofmeister and Schütz¹ observed in dogs how the peristaltic action passed lightly over the cardiac portion; the pyloric half, on the other hand, contracted in its entirety, separating itself from the cardiac end. They inferred that the pyloric part of the stomach is the real motor of the stomach, and that the fundus is simply a reservoir. Moritz² made a series of experiments on dogs and came to the same conclusion. He went further and introduced manometers into the stomachs of human beings. He proved that there are no marked contractions in the cardiac end, but that strong rhythmic contractions occur in the pyloric end. Those of you who use the stomach-tube very frequently will have noted often, when the tube enters the pyloric region, that the contents are expelled with rhythmic jerks.

There seems little doubt from all the collected evidence that the active movements of the stomach occur chiefly in the pyloric half. The exact mechanism of the emptying of the stomach is not yet thoroughly understood. Moritz³ explains it in the following ingenious manner: As there is no pressure in the cardiac portion the large pieces are not forced into the pyloric part, but slowly sink to the bottom. The fluid and brothly portions of the food are floated into the pyloric part, and from there are forced into the duodenum by the strong contraction of the pyloric part and the "sphincter antri." Moritz further adds that the high pressure in the pyloric antrum is probably the cause of the frequency with which cancer affects this region; and also, that when cancer does occur here, the motor functions of the stomach are so rapidly impaired and symptoms of gastric insufficiency arise, though the pyloric orifice itself may not be narrowed.

20 WEST NINTH STREET.

¹ Arch. f. exp. Path. u. Pharmac., 1886, Bd. xx. p. 61.

² Verh. d. naturf. Versammlung zu Nürnberg, 1893; also in Münch. med. Woch., December 3, 1895, pp. 1143-1147.

³ Loc. cit.

REVIEWS.

A TEXT-BOOK OF PRACTICAL THERAPEUTICS. By HOBART AMORY HARE, M.D., B.Sc., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia; Physician to the Jefferson Medical College Hospital, etc. Sixth edition, enlarged, thoroughly revised, and largely rewritten. Pp. xv., 758. Philadelphia and New York: Lea Brothers & Co., 1897.

WE have been familiar with the previous editions and the many changes in them which the increasing knowledge of drug-action and the enlarged clinical observation of the author have necessitated. We have noted a progress toward thoroughness and completeness; and in the present edition we find satisfaction. This is not only because of the steady improvement from the first to the sixth, but because in each edition the individuality of the author has been more and more impressed upon the work. Not that he has neglected the careful study of the current literature, for he has not; but he has thoroughly digested and assimilated the work of others, and, in many instances, carried on experimentation from the point at which investigation had stopped. Drugs, considered in alphabetical order, occupy about 350 pages. The information is concise, based largely upon personal observation, and written from the stand-point of the physician. This portion of the work presents fairly the practical therapeutics of to-day. We renew the objection which has been made on other occasions to the alphabetical arrangement, in that it tends to make the acquisition of facts of supreme importance in the professional life of the student a matter of memory unaided by physiological, chemical, or botanical relationship. The criticism is mitigated somewhat by the presentation of a therapeutic classification on pp. 36 to 39, inclusive, and we presume that the author intends that the subjects for study shall be selected by the teacher in accordance with this grouping. We could wish that the author had gone further, and made a classification which we are sure would be acceptable to those who critically study this volume. And, further, we prefer the pharmacopœial nomenclature—bismuth salicylate for salicylate of bismuth, etc.—although it seems difficult to impress upon the student the importance of the official title. If the influential text-books would be insistent upon this point, but a few years would pass before a correct nomenclature would become the rule in place of being more honored in the breach than in the observance. While the author deals with drugs which he has found to be of use to the physician, and does not intend to waste space upon therapeutic curiosities, he occasionally falls short. For example, among anthelmintics (p. 36), we find sodium santoninate, although he very properly gives warning concerning it on p. 342. Among the drugs classed as antipyretics we find thallin and kairin, which those of us who commenced at the beginning of the coal-tar antipyretics know to be entirely improper drugs for that purpose.

Occasionally we find minor omissions to conform to existing official designations, as glycerines for glycerites (p. 23), arsenious acid (p. 37). In the fifty pages devoted to remedial measures other than drugs, and to foods for the sick, there is much to commend. While this part cannot take the place of a text-book on general therapeutics, on the one hand, nor a work on dietetics, on the other, yet when thoroughly studied by the student he is in a position to become a far more competent practitioner than if he had read more elaborate but less practical expositions of these subjects. Diseases are taken up alphabetically, and here the personality of the author is pronounced. This part is eminently practical, strikingly clear, and, in the main, sound and conservative. There is no attempt to mention every drug which some one at some time has used in some phase of the disease, but to present only those which exert remedial influences. The prescriptions are well chosen and, with perhaps fewer abbreviations, leave nothing to be desired. The table of doses of medicines is sufficiently complete. The index of drugs and one of diseases close the volume. While we are appreciative of the value of this book and its many points of excellence, we would fail in our obligation to the author and to our fellow-workers if we did not call especial attention to the opening pages. There we find the position of the therapist clearly stated. Those who, in pressure of time-serving specialism, have lost their perspective, can regain their bearings and realize not only the importance, but the scientific value of the work of those laboring in a broader field which demands more elaborate preparation, more exacting study, more careful reasoning, and more painstaking research, even if its emoluments are not so immediate or so dazzlingly great. And those whose work brings them in contact with therapeutic nihilists and empirical polypharmacists, from a reading of this work may feel better equipped for avoiding the errors of both.

R. W. W.

THE ORIGIN OF DISEASE, ESPECIALLY OF DISEASE RESULTING FROM INTRINSIC AS OPPOSED TO EXTRINSIC CAUSES, WITH CHAPTERS ON DIAGNOSIS, PROGNOSIS, AND TREATMENT. By ARTHUR V. MEIGS, M.D., Physician to the Pennsylvania Hospital. With 137 original illustrations. 8vo., pp. xiv., 229. Philadelphia: J. B. Lippincott Company, 1897.

Nothing is of greater importance to the human race than a just conception of the causation and fundamental characteristics of disease, or of what our author calls the origin of disease. Without such knowledge, all efforts at prophylaxis must be uncertain and rational therapeutics impossible. The importance of the subject, then, demands that every generalization with regard to disease, induced from careful consideration of the multitudinous facts of pathology, receive attention.

But the discussion of so momentous a subject must be approached with due regard for its vastness. At the very outset it should be remembered that man is not the only sufferer from disease; that, in fact, disease is a universal biological phenomenon, affecting all classes of living beings, whether plant or animal, and that no conclusion as to its nature can be final which is not based upon due consideration of all the phenomena of disease as manifested by all living beings.

The book before us aims to present a generalization as to the nature of disease; but we regret to say that nowhere in it have we been able to detect evidence of that broad biological horizon which should be a prerequisite in the author. He seems to wholly ignore the occurrence of disease in animals and plants, and to be unaware of the importance of harmonizing his theories with the facts of comparative pathology. Nor do we find in the premises of his argument any just statement of our present knowledge of pathological phenomena even as they occur in man.

A quotation from the third chapter of the work, that in which the causes of disease are considered, may serve to illustrate the shortcomings referred to. In speaking of the etiology of tuberculosis, we read (p. 29): "Since it has been proved that cases of consumption do result from inflammation, and since at the same time it has not been scientifically demonstrated that the bacillus tuberculosis ever is its cause in human beings, but only that the bacillus is present in the altered tissues of persons suffering with the disease, it is much more logical to believe that consumption is only the result of ill-ordered growth and disintegration of the natural component parts of the organism." The proof, as absolute as scientific observation and experiment can make it, that the bacillus is the cause of the disease in animals is of no moment. The now quite numerous cases of accidental direct infection in man from pure cultures in laboratories, from broken spit-cups in hospitals, through wounds received at autopsies, and in many other ways, are entirely disregarded. We may be pardoned if, in the light of our present knowledge, we decline to accord high respect to the opinions of one who immediately follows the sentence above quoted by the statement: "To this conclusion my mind has been driven, after a prolonged and patient examination of such evidence bearing upon the subject as it has been possible to obtain."

This is but an example of what may be seen on almost every page of the book, whose publication is much to be regretted, since whatever influence it may have must tend to misconception of the true nature of disease rather than to its elucidation.

J. S. E.

ATLAS DER SYPHILIS UND SYPHILISÄHNLICHEN HAUTKRANKHEITEN
FÜR STUDIRENDE UND AERZTE. VON DR. MED. MARTIN CHOTZEN,
Heft iii., iv., v., vi. Hamburg und Leipzig: Leopold Voss, 1897.

ATLAS OF SYPHILIS AND SKIN LESIONS [RESEMBLING SYPHILIS.

THE preceding parts of this *Atlas* have been already referred to in the JOURNAL. The aim of the illustrations (chromolithographs) is practical, intended to show syphilis of the skin in its varied aspects, as well as diseases of the skin which resemble syphilis. Each part contains five or six plates, with appropriate text. Some of the pictures are good, others are not sufficiently elaborated in the drawing and coloring to be satisfactory; but it is too much to expect in a work intended for the busy practitioner, and of moderate price, that the plates should be perfection. The form of the work is small quarto, and, consequently, not too large for the shelf of a bookcase. The pictures are large considering the size of the paper. We believe that the *Atlas*, when completed, judging by the parts thus far published, will be of considerable aid and value to the physician.

L. A. D.

THERAPIE DER HAUTKRANKHEITEN. VON DR. L. LEISTIKOW mit einem vorwort von DR. P. G. UNNA. Hamburg und Leipzig: Leopold Voss, 1897.
TREATMENT OF DISEASES OF THE SKIN.

THIS is a condensed work (of over 400 pages) on the modern treatment of the diseases of the skin, as practised particularly in Hamburg in the clinic of Dr. Unna, so favorably known to the profession the world over for his numerous and valuable contributions to cutaneous medicine. Dr. Leistikow has brought together a vast amount of useful material in the way of tried formulæ, with brief indications for their employment. Short descriptions of the diseases of the skin are given. Authors of various nations are quoted, but the great majority are German. We commend the book heartily to all interested in dermatology.

L. A. D.

ILLUSTRATED SKIN DISEASES: AN ATLAS AND TEXT-BOOK. By WILLIAM S. GOTTHEIL, M.D., Professor of Skin and Venereal Diseases at the New York School of Clinical Medicine, etc. Portfolios I., II., III. New York: E. B. Treat & Co., 1898.

WE are in receipt of the first three parts of this work, which will be issued in quarto portfolios, each comprising twenty-four pages of text, with formulæ and four plates of cases from life, in color and in plain photographs. It is expected that the work will be completed in twelve portfolios.

Portfolio I. takes up the anatomy and physiology of the skin, the former being illustrated for the most part by photomicrographs, some of which (as, for example, the hair and the sebaceous glands) are particularly good. The illustrations in color are obtained through the camera, the color-plates being made from color negatives directly taken from living subjects. The result, in our opinion, is in some cases satisfactory; in others not at all so, the chief defect being want of sharpness of outline, with blending of colors and blurring. Concerning the plain photographs, Dr. Gottheil has said that most of them are good, some being excellent. His large collection of photographs, taken with his own well-known skilful and artistic hand, has enabled him to have reproduced the most illustrative cases of the diseases considered. We have no hesitation in saying that the photographs in the part before us will be of great service to the practitioner. Some of them, we would add by way of criticism, might have been larger, even if part of the picture had been sacrificed to accomplish this end. They represent, for the most part, everyday cases. The classification, we are particularly pleased to note, is built upon the lines of the classic and practical work of Hebra, from which students the world over have so successfully studied dermatology during the past forty years. The nomenclature is conservative and satisfactory. The text is written in a straightforward, plain, practical style, is terse and to the point. Many formulæ are introduced in the paragraphs devoted to treatment. The latter is conservative and in accord with the teachings of the day. We shall look forward with much interest to the succeeding parts, which we are assured are soon to follow those under review.

L. A. D.

A TEXT-BOOK ON SURGERY, GENERAL, OPERATIVE, AND MECHANICAL. By JOHN A. WYETH, M.D., Professor of Surgery in the New York Polyclinic Medical School and Hospital. Third edition, revised and enlarged. New York: D. Appleton & Co., 1898.

THE first edition of Dr. Wyeth's *Surgery* was issued in 1888; the second in 1890; and the third appears in the present year, with considerable rearrangement, and, according to the author, practically rewritten. The present edition contains about two hundred new figures, and it has evidently been the effort of the author to bring the text up to the present state of surgical science. The account of bacteriology as applied to surgery is rather full, as it should be. The first edition gave no special attention to this subject, as, when it was written, the important bearing of the science of bacteriology on practical surgery was only beginning to be recognized in America.

An inspection of the book impresses one with the fact that the relative amount of space given to various subjects is not always judicious. In a text-book of surgery it does not seem appropriate to occupy many pages with anatomical descriptions and illustrations of the branches of arteries. While the ligation of arteries is exceedingly important, there is, perhaps, too much space given to the anatomical relations. The same criticism as to length applies to the article on arteritis. If the space given to these subjects were curtailed, and more given to the section on tumors, for example, the book as a treatise on surgery would be more symmetrical, and the reviewer believes more valuable to the practitioner and student.

An extended review of a book which has come to the third edition is scarcely needed, because it is well known to professional readers. A curious omission in the volume at hand is the absence of a table of contents.

J. B. R.

THE PRINCIPLES OF BACTERIOLOGY: A PRACTICAL MANUAL FOR STUDENTS AND PHYSICIANS. By A. C. ABBOTT, M.D., Professor of Hygiene and Director of the Laboratory of Hygiene, University of Pennsylvania. Fourth edition, enlarged and thoroughly revised, with 106 illustrations, of which 19 are colored. Small octavo; pp. i.-xii., 13-543. Philadelphia and New York: Lea Brothers & Co., 1897.

THE fourth edition of Abbott's *Principles of Bacteriology*, although published for some time, has but just been submitted to us for review. The book grows in size, in spite of the author's efforts to prevent it, and of necessity, for as time advances and the knowledge of the bacteria increases, any book pretending to give a reasonably complete summary of this knowledge or of the technique of bacteriological investigations *must* become more and more bulky. The volume covers a field of its own—unique in this country, and this edition continues and emphasizes the claim it has always made as a standard manual for students and practitioners. The chapter upon Infection and Immunity is a particularly interesting brief statement of an extremely complex subject.

H. C. E.

DIE ELEMENTE DER PATHOLOGIE. Von DR. EDUARD VON RINDFLEISCH, Professor in Würzburg. Dritte Auflage. 8vo., pp. x., 320. Leipzig, 1896.

THE ELEMENTS OF PATHOLOGY. By DR. EDWARD VON RINDFLEISCH, Professor at Würzburg. Third edition.

WE welcome with more than usual interest a new edition of Professor Rindfleisch's *Elements of Pathology*, because in it we see an old and tried friend rejuvenated and brought well up to date. During the thirteen years which have elapsed since the publication of the previous edition, so rapid and radical changes in our conception of disease, more particularly as regards its etiology, have taken place that the book which was in its day a standard had drifted into oblivion. We now see it infused with new life and again well to the front of our aids to a thorough knowledge of disease.

But in this book we find something more than in the usual elementary text-book of pathology. It is not merely a statement of the structural changes in the various organs incident to disease and of their causation. The author takes a broader view of pathological processes, and great stress is laid upon the subjective and objective manifestations of disease, upon symptomatology. In fact, the arrangement of the subject-matter hinges upon the symptoms rather than upon the structural changes of disease, the division of the book being into two great sections—General Symptomatology and General Etiology. But while this is the arrangement of the book, and the first importance is given to symptomatology, it must not be supposed that the changes in structure underlying these outward manifestations of disease are slighted. On the contrary, they and the normal physiology of the tissues and organs are made the very foundation of the rational explanation of the various symptoms, the effort being to show how, from the symptoms, inference may be made back to the underlying structural and functional disturbances which are their cause. This is most suggestive, and is, we think, the way in which the manifestations of disease should be presented. The study of symptomatology is of little value if it merely enables us to attach a name to the symptom-complex of the disease which afflicts our patient. It should afford us the knowledge which shall enable us to look behind the surface to the deeper causes of his suffering. These are what the physician must recognize, and to their removal his treatment must be directed. Unless he can correctly interpret the symptoms laid before him his attempt to accomplish this end must be in great measure imperfect.

It is the failure of many authors of treatises on pathology to appreciate this fact, and to accord to symptoms their fair share of consideration, which often in a marked degree limits the usefulness of their works to the clinician. It is because the book before us is eminently practical in this way that we venture to predict for it extended reading and a wide usefulness.

J. S. E.

PROGRESS OF MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,

PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL
SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

The Poisonous Action of Creosote and Guaiacol as a Comparison with that of their Carbonates.—DR. W. HESSE gives the result of six experiments upon dogs: 1. Creosote, 1 to 625 body-weight, caused death in twenty minutes. The necropsy showed acute gastro-enteritis (stomach strongly corroded, small intestines markedly inflamed), and pulmonary œdema from cardiac paralysis. 2. Creosote carbonate, 1 to 3165 body-weight, did not give rise to the slightest disturbance. 3. The same dog on the following day received creosote carbonate, 1 to 600 body-weight, but presented no abnormal symptoms beyond hebetude. 4. A dose of the same, 1 to 500 body-weight, gave no results. 5. Guaiacol, about 1 to 1000 body-weight, gave rise to uncertainty in hind legs, falling, vomiting, trembling, especially of the limbs, and sluggish pupils. The vomiting continued, with noisy respiration, watery discharge from the mouth, and later subnormal temperature, slow respiration, and slow pulse were observed. Death followed in about seven hours from the administration of the drug. The necropsy showed acute gastro-enteritis (marked inflammation of the gastric and upper portion of the small intestine and swelling of the rest) and pulmonary œdema from cardiac paralysis. 6. Guaiacol carbonate, 1 to 500 body-weight, caused no symptoms. 7. The same, 1 to 380 body-weight, also produced no result. In conclusion, it can be stated that both creosote and guaiacol in large doses are poisonous, and cause death through their corrosive action, and, *per contra*, creosote and guaiacol carbonates, even in large doses, have no influence upon the system.—*Deutsche medicinische Wochenschrift*, 1898, No. 5 (Beilage), S. 11.

The Therapeutic Results from Salophen.—DR. RICHARD DREWS sums up these as follows: 1. The remedy is absolutely harmless in daily amounts of from forty-five to ninety grains. 2. Since it is odorless and tasteless, it can be administered as a simple powder, in compressed tablets with starch or

sugar-of-milk, or as pills. 3. It passes the stomach unchanged, without producing any gastric disturbance, and in the intestine is so slowly broken up into salicylic acid and acetyl-paramidophenol that the former acts *in statu nascendi* for a considerable period of time, but does not give rise to untoward action. 4. It is an excellent anti-rheumatic, acting in acute and subacute articular and muscular rheumatism equally as well as do salicylic acid and sodium salicylate, but without their unpleasant after-effects. 5. In chronic articular rheumatism it is no more useful than the above-mentioned drugs. 6. It is an excellent anti-neuralgic and analgesic in cephalalgia, migraine, odontalgia, facial, trigeminal, and intercostal neuralgia, and in the nervous form of influenza. 7. It produces good results in chorea. 8. It acts well in various skin affections which are accompanied with itching: prurigo, urticaria, the pruritus of diabetes and eczema, and psoriasis.—*Therapeutische Monatshefte*, 1898, Heft 3, S. 146.

The Action of Coronillin.—DR. HUGO GUTH administered this glucoside in daily dose of from one and a half to seven grains, but, finding that three grains in one dose caused diarrhoea, kept five grains as the maximum daily amount. Several authors have recommended this remedy as a valuable one to promote diuresis, relieve dyspnoea, and increase the arterial tension in diseases of the heart. From the results of its use upon nine patients he concludes that: 1. It is not emulative. 2. It produces a transient diuresis. 3. Its direct action upon the pulse is questionable. 4. In many cases diarrhoea is seen. 5. There are many instances of idiosyncrasy. 6. Because the diuresis which it produces is transient, it cannot replace digitalis. The undesirable diarrhoea which it causes prohibits its extensive use.—*Therapeutische Monatshefte*, 1898, Heft 1, S. 31.

Natural vs. Artificial Medicated Thermal Baths.—DR. T. LINDSAY PORTER states the artificially medicated bath has a certain temperature when first entered; but this is not maintained, and although the patient may be rubbed in the water in the same way as if he were in the natural thermal bath, the same results do not manifest themselves. The reason for this may be that in hot spring baths the water is in constant motion, running in and out at the same temperature. This gentle moving of the water may cause a certain amount of what may be termed hydraulic massage or surface friction, thereby setting up a kind of congestion of the small capillaries, and as vessels in a state of congestion have more absorbent power than in a perfectly natural state, the chemical constituents of the water would be more easily absorbed and so enter the circulatory system in greater quantities than would otherwise be the case.—*Philadelphia Medical Journal*, 1898, No. 11, p. 473.

The Real Value of the [So-called] Brand Bath in Typhoid Fever.—Drs. H. A. HARE and CHARLES ADAMS HOLDER summarize their conclusions as follows: The mortality to-day all over the world, except in the presence of individual epidemics of malignant infection, is not over 15 per cent., and if the patients receive good nursing and non-meddlesome treatment, about 10 per cent., or less. Therefore the saving of life by the

bath is not the difference between 25 and 7 per cent., but between 10 and 7 per cent. at the very best. This method does not shorten the attack, but probably prolongs it. The relapses are much more frequent under it. Hemorrhages are more frequent, when in reality the modification of all the symptoms by the bath would lead us to expect a decrease in their number. The frequency of perforation is not decreased. The difference in mortality is due to the favorable effect of the bath on the nervous system, circulation, respiration, and the toxæmia, for the other causes of death remain unaltered in frequency or are increased. It would seem opportune to protest against the almost universal application of the bath to this disease. It is, or ought to be, a fundamental law of therapeutics that there is no such thing as treatment by hard-and-fast rules of routine. The recommendation that all patients suffering from typhoid fever with a temperature of 102° to 102.5° F. shall be placed in a tub of water at 65° to 70° F. is an affront to this rational law. When we consider all the points in the cold-bath treatment, it is almost impossible to avoid the thought that it is a measure to which in a few years we will look back with the same distress that we regard venesection and other excesses. The following rules are suggested: 1. When admitted early in the disease, with constipation or moderate diarrhœa, a full dose of calomel should be given in divided doses in order to stimulate the liver and antisepticize the bowel with bile. 2. Control of fever, when it reaches 102°, by sponging, or, this failing, resort should be had to the tub. 3. It is advisable not only to use friction in a light form, but to use moderately active massage with the same objects in view as when the rest-cure is undertaken. 4. In nearly all cases give more nourishment than the average typhoid patient has usually had in the past. 5. Use stimulants in carefully graduated doses whenever the circulation needs them, particularly alcohol.—*Therapeutic Gazette*, 1898, No. 3, p. 153.

[In the Maidstone epidemic the total number of cases of typhoid fever to December 11th was 1885, mortality 7.5 per cent. Inasmuch as these patients were under all sorts of treatment, taken care of in the only way possible with various surroundings, it is evident that the devotees of the so-called Brand method must revise their statistics to meet the demand for an improved death-rate.—R. W. W.]

Labial Eczema and Mouth-washes.—DR. A. NEISSER treated a six-year old boy for several months for a severe squamous eczema of the upper and under lip, but without success. The disease ceased coincidently with the disuse of a mouth-wash known as "Odol." The formula of this is said to be: salol, 3.5; alcohol, 90; distilled water, 4; saccharin, 9.2; with oils of peppermint, anise, fennel, cloves, and cinnamon. Apparently oils of cloves and cinnamon, when ingredients of mouth-washes and tooth-powders, can give rise to severe eczema.—*Therapeutische Monatshefte*, 1898, Heft 2, S. 79.

Icterus from the Use of Lactophenin.—DR. KURT WITTHAUER reports the histories of four patients. In these he considers that the drug was doubtless the cause of the appearance of the icterus, which appeared to be of the true catarrhal variety due to obstruction. Toward this view the colorless passages and the dyspeptic symptoms point. Strauss produced hemor-

rhagic erosions in the gastric mucous membrane in one rabbit, and in another congestion and mucous secretion, with a reddening of the duodenal mucous membrane. In neither was there a yellow discoloration of the conjunctiva. These observations indicate that care should be taken in the use of the remedy, which gives excellent results in the various neuralgias and in cases where an antipyretic is needed, but they are not intended to discredit it.—*Therapeutische Monatshefte*, 1898, Heft 2, S. 111.

Poisoning by Convallaria Majalis.—Dr. J. H. ANDREWS reports that a child, aged two years, took nearly a teaspoonful of the fluid extract. She became extremely restless, showed a continual trembling in the arms and legs, and once general convulsions. She was aroused with great difficulty, and immediately relapsed into stupor. The pupils were moderately dilated. The axillary temperature was 97° F.; pulse 140 at times, at others too rapid to be counted, but always exceedingly irregular. Respirations were shallow and superficial, increased somewhat in rapidity, but were very regular. The face was somewhat flushed. There was no gastro-intestinal, renal, nor skin irritation. Under symptomatic treatment the child gradually regained her normal condition.—*Therapeutic Gazette*, 1898, No. 2, p. 144.

The Local Anæsthetics.—MR. CHARLES NITZBERG states that the following precautions should be observed in the use of cocaine: 1. The patient should be in a recumbent position during cocaineization and for several hours after, in order to avoid syncope. 2. The solution should be one of 1 per cent.; the strength has more influence as regards accidents than the quantity absorbed. 3. The quantity of the drug (as hydrochloride) used should not exceed two or two and a half grains. 4. The solution, when used hypodermatically, should not be thrown into a vein. 5. At least five minutes should elapse after the last injection before commencing the operation. 6. Avoid the use of the drug in all cases where the area involved is large, and especially when its boundaries are not known in advance. Synthetic cocaine gives results which are varied and even contradictory. Cinnamyl-cocaine, which is ordinarily found with cocaine in the leaves, is slightly anæsthetic; it is also slightly toxic. Isotropyl-cocaine has no anæsthetic properties, but it is a violent heart-poison, which may explain some of the accidents which have followed the use of cocaine obtained from the leaves. Tropa-cocaine does not disturb the physiological equilibrium of patients, but its anæsthetic power is less pronounced than that of cocaine. Methyl- and benzoyl-eegonine have little anæsthetic power, and they are twenty times less toxic than cocaine. Of the homologues when methyl is replaced by ethyl, propyl, isopropyl and isobutyl, Falck believes that these act as does cocaine. Methyl-valeryl, methyl-cinnamyl, and methyl-phityldi-eegonine are not anæsthetic. The norcocaines (methylanide group replaced by the radicle imide) are more anæsthetic and much more toxic than cocaine. Dextrogyre is more anæsthetic, but also more irritant than levogyre-cocaine. Because of the last property it has been rejected by ophthalmic surgery. Eucaine A. is a vasodilator, in equal amounts less anæsthetic, shorter in duration, producing a burning sensation, but it influences the pupils less. Vinei believes its toxic equivalent is less, and that its effect on the heart is not

greater than that of cocaine. Eucaine B. has the same properties, but is two or three times less toxic than A. Holocaine is of greater toxicity than cocaine, and should be employed with rigid observance of the conditions found earlier in this article. It is of equal anæsthetic power with cocaine. Anæsthesia comes on within one or two minutes and lasts ten to fifteen minutes. In ophthalmology it is preferable because it does not dilate the pupils or dry the cornea, which remains moist during the entire operation. In stomatology its advantages are such that it should be preferred to cocaine.—*Les Nouveaux Remèdes*, 1898, No. 5, p. 97.

The Action of Xeroform.—DR. M. KAISER has used this remedy, which is tribromophenol-bismuth, in minor surgical operations upon sixty patients, and notes its points of preference to iodoform as non-poisonous, absence of irritation, and absence of odor. So far as positive properties are concerned, its use has been satisfactory.—*Medicisch-Chirurgische Centralblatt*, 1898, No. 4, S. 41.

The Medicinal Treatment of Rheumatoid Arthritis.—DR. GILBERT A. BANNATYNE has latterly experienced a change of belief in regard to the relief and curability of this disease. Assigning a micro-organism as the cause of it, and failing an antitoxin, he has employed drugs which possess high eliminative powers and which have been found useful in other microbic conditions. These he has sought for in the phenol group of antiseptics, and particularly creosote or some of its compounds or derivatives. Creosote and guaiacol have been abandoned because they produce great intestinal irritation, are caustic, and coagulate albumin. In their place he employs creosote carbonate, guaiacol carbonate, and benzosal; none of these are caustic, and absorption takes place gradually from the intestines. Creosote carbonate is administered in capsules or emulsions of yolk of egg, in dose of from 5 to 20 minims daily. Guaiacol carbonate can be given in powder, cachet, or pill, 5 to 15 grains thrice daily, and rapidly increased. Benzosal, in dose of 4 grains thrice daily, can be increased to six times this amount. This, however, is feebler in its action. In practice guaiacol carbonate is his routine treatment. Almost from the first the pain becomes less, the swellings diminish, the heat of the skin over the joints goes, the general body temperature falls, the pronounced facies becomes less noticeable. Even in the advanced stages of the disease, with great destruction of tissue, constant care, the free use of this drug, combined with bathing and dietetic regimen will result in improvement. The only contraindication, at present, appears to be the presence of nephritis. As to the mode of action, it would appear that they have no specific action on the bacilli themselves, nor upon their toxin-producing power. They act locally on the alimentary canal before absorption and afterward by favoring the elimination of the toxic albumins with which they combine. Guaiacol leaves the body by the kidneys as an ethereal sulphate, showing that after decomposition has occurred the guaiacol is absorbed, and that it combines with the sulphur of the albuminous constituents of the blood. This combination must occur with such substances as most readily lend themselves to chemical combination, and, as having such properties, are the poisonous toxic albumins which are produced during the life-cycle of

bacteria. The compounds of guaiacol with the products of bacteria are readily acted upon by the oxygen of the blood, so that the guaiacol, together with the sulphur of the albumin molecule, is deposited out of the compound, and is oxidized to guaiacol sulphate, while the remainder of the albumin molecule is still further decomposed. These products are removed from the blood chiefly by the kidneys. In addition to the internal administration, external applications of equal parts of olive oil and guaiacol are painted over the affected joints each night. This produces numbness, later coolness, relieves pain, and later lowers joint-temperature. If the smell is objected to, 1 or 2 per cent. of oil of cloves may be added. The strength of the guaiacol may be increased, but if too strong it may blister, which, however, produces no evil effects. One instance only of its use is reported in full.—*Edinburgh Medical Journal*, 1898, No. 1, p. 60.

Pilocarpine.—DR. EDWARD F. WILLOUGHBY states that this is one of those drugs the full effects of which can only be obtained when they are injected subcutaneously. When thus administered the action is prompt and palpable; that of repeated internal doses, many times greater than the former, is uncertain and slow to such an extent as to take away all confidence. Indeed, it seems that alarming cardiac depression may be brought on without any previous perceptible diaphoresis. If a continued perspiration, and the consequent fall of temperature following on the lowering of the heart's action, and the general arterial tension be required, it is best to use aconite; but when prompt and energetic action is desired pilocarpine presents indisputable advantages. Instances of its use in pneumonia, insomnia, and lumbago are cited. Should, however, the action of so powerful a drug, from whatever cause, prove excessive and give rise to alarming or unpleasant effects, we have in atropine an absolute physiological antidote, no less prompt in its action. In an instance reported the evil effects from one-sixth grain of pilocarpine were speedily neutralized by the subcutaneous injection of one-fiftieth grain of atropine.—*The Therapist*, 1898, No. 3, p. 56.

Treatment of Erysipelas.—DR. FRANK PARSONS NORBURY for local application prefers the combination of camphor and carbolic acid in about equal parts, which is antiseptic, but not escharotic. This allays the burning and soothes the irritation. The skin must be thoroughly cleansed before its application, and it should be used thoroughly and frequently and ahead of the line of demarcation. Ichthyol is useful as: Ichthyol, 1; ether, 1; in flexible collodion, 2; which is applied with a camel's-hair brush. Regular feeding at short intervals with highly nutritious but easily digested food is of importance. Milk, eggs, and beef peptonoids are to be recommended. All severe cases require alcoholic stimulation in ample amount. An aged person bears coffee well, taken hot at frequent intervals. For the restlessness and insomnia, sodium bromide in twenty-grain doses may be given as often as necessary. If delirium is present the fluid extract of hyoscyamus, with sufficient cannabis indica to obtain its sedative effect, is useful.—*Medical Fortnightly*, 1898, No. 8, p. 223.

MEDICINE.

UNDER THE CHARGE OF

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Mitral Stenosis: A Statistical Inquiry.—SAMWAYS (*British Medical Journal*, February 5, 1898, p. 364) gives the analysis of the cases of mitral stenosis found at autopsy at Guy's Hospital during the ten years, 1886 to 1895, inclusive. In a previous communication he endeavored to show from statistics of the autopsies during four years that "the characteristic alteration in the left auricle in mitral stenosis is not dilatation, but hypertrophy."

During the ten years there had been 4791 necropsies, in 196, or 4 per cent., of which the mitral orifice measured three and a half inches or less. The stenosed orifice exceeded two and a quarter inches (one finger) in circumference in 108 cases, and measured two and a quarter inches or less in 85. Of the 196 cases, 107 were females and 89 males. The average age of death for both males and females was the same—thirty-eight and a third years.

In 32 instances tricuspid and mitral stenosis occurred together. Of these 21 were females and 11 males. The tricuspid stenosis accompanied almost exclusively the severe form of mitral disease which was present in 24 of the total 32 cases.

In "a large proportion" of all the cases the aortic valves were thickened, distorted, or otherwise defective, but were seldom referred to as stenosed.

Excluding the cases for 1886 (which were not recorded accurately enough for most statistical purposes) there were 77 cases of severe and 96 of the slighter form of mitral stenosis for the other nine years. Auricular hypertrophy was recorded as present in 44 of the 77 cases of severe mitral stenosis, and in 21 of the 96 slighter cases; that is, in more than half of the one, and in less than a quarter of the others; it is therefore associated especially with severe stenosis.

The left auricle was stated to have been much dilated in 14 of the 77 cases of severe stenosis, dilated (extent not stated) in 18 others, and slightly dilated in 7. Among the 96 less severe cases it was much dilated in 8, dilated (extent not stated) in 15, and slightly dilated in 6.

Hypertrophy of the right ventricle, of more or less marked grade, was present in 41 of the 77 severe cases, and in 25 of the 96 cases of less marked stenosis.

The right ventricle was dilated in 40 of the 77 severe cases and in 27 of the 96 slighter cases.

The left ventricle was generally normal or small; rarely enlarged by hypertrophy or dilatation.

Pericarditis had been present in nearly one-third of all the cases. The pericardium was universally adherent in 35 instances.

Sudden death occurred in at least 7 cases.

Samways' statistics further indicate that a presystolic murmur is heard sometimes in the course of the disease in about three-fifths of all cases, and a thrill felt in about one-third or less; while a history of rheumatism may be traced in upward of 60 per cent. of all cases.

The Origin and the Chemical Composition of the Myelin Droplets of the Sputum.—SCHMIDT (*Berliner Klin. Wochenschrift*, January 24, 1898, S. 73) discusses the origin of the sharply-defined, homogeneous droplets of various sizes seen so often in association with alveolar epithelial cells in the small amount of grayish sputum expectorated by so many healthy persons early in the morning. In 1854 Virchow applied the term myelin droplets to these bodies from their resemblance to the droplets seen in degenerated nerve-fibres. Panizza held that they were mucin in composition, and were a product of secretion of the goblet-cells. Buhl, Guttman, and Smidt, on the other hand, believed that they result from a "myelin" degeneration of the alveolar epithelial cells, whose protoplasm frequently show the droplets in great numbers.

Schmidt advances an entirely different view as to their origin. He thinks they are secreted by the mucous membrane of the larynx, trachea, bronchi, and bronchioles. This conclusion was partly based on his observations on a case of carcinoma, the patient during life having expectorated sputum rich in myelin droplets. At the autopsy the lungs were found perfectly healthy. The examination of the mucous membrane of the air-passages showed these droplets to be present in great numbers, even down to the finest bronchioles, although they were much smaller in the latter than in the larger bronchi and trachea. He failed, however, to find any droplets in the exudate pressed out of the air-cells. His conclusion is that the droplets do not arise as a product of degeneration of the alveolar epithelial cells, but that those seen within these cells have been taken up by them, or imbibed, as he expresses it. The size of the free droplets varies much, owing to their tendency to run together.

Schmidt carefully studied the chemical composition of these bodies under the supervision of Müller, of Marburg. He concludes that they consist chiefly of protagon, in association with smaller amounts of cholesterin and lecithin. He also thinks that cholin, glycerin-phosphoric acid, and fatty acids are present in traces.

A Case of Leukæmia in a Child at Birth.—POLLMANN (*Münchener medicinische Wochenschrift*, January 11, 1898, S. 45) reports a case of leukæmia which, he thinks, had its origin during intra-uterine life. The infant, a female, was born on May 18, 1897. Both parents were perfectly healthy, and no history of their having had malaria, lues, or leukæmia could be obtained. The child had red spots the size of a pinhead on the forehead and legs when it was born. The mother remarked at the birth of the infant that it was not a healthy looking child. It was noticed by the mother that when-

ever the child attempted to cry its face became swollen and cyanotic. On June 1st, fourteen days after birth, the child was brought to the clinic for treatment. The child was poorly nourished and the skin was slightly jaundiced. The lips were slightly cyanotic. There were numerous bluish-red petechiæ, the size of a pinhead or hempseed, on the forehead and cheeks, and smaller numbers on the chest, forearms, and legs. The umbilicus appeared normal. Abdominal examination revealed the fact that the liver and spleen were enormously enlarged. The superficial lymph glands were not palpable. The temperature was 38.8° C. The blood-count showed 2,500,000 reds. The leucocytes were enormously increased, the ratio of leucocytes to red blood-cells being 1 : 8, although the exact count of the white cells is not stated. The leucocytes were made up almost entirely of mononuclear elements, with fairly large nuclei and rather broad, transparent protoplasmic rims about them.

As a result of the examination Prof. Penzolt made a diagnosis of leukæmia with the probability of a patent ductus arteriosus Botalli.

The child's condition gradually got worse until June 5th, when death occurred. The temperature rose to 41.5° C. a few hours before death.

On the following day an autopsy was performed. The anatomical diagnosis was briefly as follows: Vegetative endocarditis of the tricuspid valve, with hypertrophy of the right ventricle; patent foramen ovale and ductus arteriosus Botalli; enlarged liver and spleen; swelling of the mesenteric and retroperitoneal lymph glands; emphysema of the left lung, and extensive atelectasis of the left; uric acid infarcts of the kidneys; general anæmia.

Cultures were taken from the liver and spleen and the blood of the right heart. The former were entirely negative, while only one colony grew from the latter, which was thrown out as a possible contamination.

The histological appearances of the liver and spleen are described, the main point being the enormous increase of the leucocytes in the vessels.

The characters of the leucocytes as seen in the vessels of these organs are given in detail. The great majority of the white cells were mononuclear elements about one and one-half the size of the red blood-corpuscles, and differed from ordinary lymphocytes in that the nuclei were much richer in chromatin than those of the latter. In addition to the above were cells with very large nuclei markedly deficient in chromatin. Pollmann considers these cells to be similar in origin, but possessing differences in the characteristics of the nuclei. Finally, there were other mononuclear cells whose abundant protoplasm was granular and stained a deeper tint with eosin than in the case of the other cells. These were not eosinophilic leucocytes, nor is it stated that they were myelocytes. No typical eosinophiles were found. Typical transitional and polymorphonuclear leucocytes were absent.

The above cells were believed to have been derived from the spleen and bone-marrow rather than from the lymphatic glands, and the case is considered by Pollmann to be one of spleno-myelogenous leukæmia, although it does not present the typical picture usually seen. An explanation advanced for the blood picture is that it was a case of acute spleno-myelogenous leukæmia.

The etiology of the leukæmia is described at length, and Pollmann thinks that the endocarditis, which was in all likelihood intra-uterine and bacterial

in origin, although the cultures were negative, may quite probably have been the exciting agent causing the leukæmia in this case. He is inclined to believe that the leukæmia existed at the time of birth.

Thyroid Treatment.—A. MAGNUS LEVY (*Zeitschrift für klin. Med.*, Bd. 33, p. 258) gives the following conclusions from a series of investigations on this subject: 1. The loss of weight after the ingestion of thyroid is not due exclusively to loss of water and albumin, but in part, in some cases, to loss of fat. Thyroid causes, therefore, a genuine reduction of fat. 2. So far as this is due to increase of normal tissue-change it is moderate, except in myxœdema. Loss of weight amounting to five or more kilos in a few weeks is due to loss of water, albumin-breakdown, and loss of fat from (pathologically) increased muscular activity, or later, from diminished consumption of food after long-continued administration. 3. Increase of metabolism does not occur in all persons who take thyroid. It is most marked in myxœdema; is evident, but much less so, in many cases of obesity and in nervous women with masked Basedow's disease. Many fat but healthy persons show no elimination above normal. The causes of these differences are not clear; perhaps the qualitative and quantitative differences in the thyroid function come into play, besides other things. 4. The proteid deficit in thyroid feeding may continue even in case of superalimentation, and is, therefore, a specific, toxigenic effect of the substance. It is most marked in the beginning of treatment, and can diminish in consequence of habit or for other reasons. In many individuals, it, like other effects of thyroid, may be absent. 5. Thyroidin shows effects on metabolism like those of the extract of the glands, but thyreotoxin and potassium iodide give no such results. 6. The great importance of the thyroid function in the life of the higher organisms is plainly shown on metabolism. Absence of this function causes (in cretinism, myxœdema, and cachexia thyreopriva) not only defective growth and serious bodily and psychic degeneration, but also a distinct decrease of gaseous interchange, of heat production, and of the total metabolism. The excessive and abnormal function causes (in Basedow's disease) increased metabolism and emaciation. Administration of the gland in such cases is followed by increased metabolism and improvement of symptoms. 7. The loss of fat and albumin in thyroid feeding shows a plain analogy with the same process in Basedow's disease, and is toxic when it reaches a high grade, as shown by the numerous unpleasant symptoms on the heart and nervous system, as well as by the effect on tissue-change. Thyroid preparations must, therefore, be used cautiously in the treatment of obesity. 8. The occurrence of constitutional obesity has not been demonstrated. Tissue-change in obese persons is the same as that in a normal person of the same size, weight, and musculature. Lessened tissue-change is not impossible for certain obese persons, and clinical experience suggests the possibility of great reduction of force-compensation in certain cases, but positive knowledge is lacking.

Capillary Thrombosis and Blood Cylinders.—LITTELL published some observations two years ago on the appearance of certain cylindrical bodies in the blood. He thought these were made up of blood-plates, and mentioned

their occurrence in the blood of chlorotics, among others. BUTTERSACK now brings these bodies in relation with certain processes (*Zeitschrift für klin. Med.*, Bd. 33, p. 456), and although Litten in a recent article denies this, the suggestion is, nevertheless, interesting. Buttersack found the cylinders especially in chlorosis. He thinks they are formed in the capillaries, constituting thrombi, which can, however, be washed through into the distal blood by forcible currents. They do not, therefore, produce gross lesions, but rather disturbances of the finer nutritive processes. He explains some of the symptoms of chlorosis which have usually been ascribed to oligochromæmia, to such thrombi, but his chief reason, the disappearance of the symptoms under excitement, could as well apply to increased vascular turgor without previous thrombi. More interesting is the suggestion that gastric ulcers can be explained by such thrombi, not only as regards their origin, but also, what is more difficult to explain by former theories, their slow healing, which he looks on as an evidence of the alleged capillary thrombi. The author disclaims an intention of making the blood-cylinders pathognomonic of chlorosis.

Digestion-Leucocytosis and Cancer of the Stomach.—The claim of Schneyer (see abstract in *THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES*, April, 1895), that the absence of digestion-leucocytosis is a diagnostic sign in cancer of the stomach, has been investigated by others with results that materially weaken the earlier claim. Recently A. HOFMANN (*Zeitschrift für klin. Med.*, Bd. 33, p. 460) and T. L. CHADBOURNE (*Berliner klin. Wochenschrift*, No. 2, 1898) have independently come to the conclusion that not only may digestion-leucocytosis be present in some cases of cancer, rare, it is true, but that it may be absent in a number of other gastric diseases. Chadbourne is no doubt right in thinking the examination may be of some assistance in obscure cases. He thinks the presence or absence depends on the condition of the gastric mucous membrane. Hofmann found no relation between digestion-leucocytosis and anacidity, either in cancer or other diseases, nor was cachexia a constant factor. Cancer as such has no effect, and he inclines to the belief that all organic changes in the digestive tract that affect absorption come into play.

Mixed Infection in Pulmonary Tuberculosis.—SCHABAD, working under the direction of Afanassiew, furnishes an important contribution to this subject, so closely connected with the active exploitation of specific remedies for tuberculosis at this time (*Zeitschrift für klin. Med.*, Bd. 33, p. 466). A full and competent review of the previous literature is given, though we miss a reference to the important work of Prudden on the influence of mixed infection in the experimental production of cavities. The investigation proper included the clinical study of the cases, the bacteriological examination of sputum and blood during life, and of the organs post mortem. Much attention was given to the study of the streptococci of the mucous membranes. Failure to examine these fully led some of the earlier workers into error. In all thirty-one cases were examined clinically, and seventeen of these also post mortem. We must content ourselves here with the author's conclusions: 1. By mixed infection in tuberculosis should be understood cases in

which the associated bacteria are in the lung-tissue (alveoli or capillary bronchi) or in the blood. 2. The finding of pathogenic bacteria in sputum (Kitsato's method), even in pure culture, does not suffice to prove a mixed infection. Experience shows that these bacteria, the pyogenic streptococci excepted, do not all come from the lung. 3. It is very important not to confuse the pyogenic streptococci with the streptococci of the mucous membranes. These resemble the former, but differ essentially in biological character and in the absence of pathogenicity. The mucous membrane streptococci are harmless parasites, but the genuine pyogenic streptococci are of grave prognostic importance, as they cause the larger proportion of all mixed infections in tuberculosis. 4. Rarer than streptococcus infection is that with tetragenous cocci and pneumococci, or double infections with one of these and staphylococci. 5. Secondary infection usually complicates the later stages of tuberculosis, and rapidly causes a fatal outcome. It is so common that almost all cases that come to autopsy show it. 6. The importance of secondary infection in the pathological process consists in this: that it either takes part in the pneumonic process always present in tuberculosis, or if not actually the cause of exudation, exerts an influence on the general condition of the patient and on the fever by the toxins, and also assists in cavity-formation. It can also cause fatal septicæmia. 7. There are undoubted cases of tuberculosis that show all the symptoms of the hectic stage, and end fatally, without the action of any other organism than the tubercle bacillus. 8. Uncomplicated, progressive pulmonary tuberculosis is characterized by hectic fever of inverse type. In mixed infection with streptococci the typical curve is rarely observed, the temperature being usually remittent or approaching the continued type. 9. Normal temperature characterizes the stationary uncomplicated tuberculosis. Mixed infection with normal temperature is not very probable.

Lesion of the Conus Terminalis.—H. LABIN (*Wiener klin. Wochenschr.*, 1898, No. 10) reports the following: A man of fifty-five years fell from a wagon, a distance of about a metre, striking on the back. At once he felt severe pain in the back and was unable to rise. The whole body "felt as if dead." There was retention of urine and feces, lasting for five days. The paralysis lasted a week. Examination soon after showed no alteration in the eyes (the visual field not lessened); no pain in the spine; no atrophy nor loss of sensibility of the upper extremities, but loss of strength there, increased reflexes, and in the deltoids fibrillary contractions. In the legs passive motion was normal, the muscles weak, the tendon reflexes much exaggerated, the plantar reflex abolished, the cremasteric, abdominal, and other skin and mucous membrane reflexes intact. Sensation was preserved in all parts of the lower extremities, but there was a striking alteration of the temperature and pain senses. This was largely localized to both feet above the malleoli, higher right than left, the middle and lower half of the lateral thirds of the calves, the lateral thirds of the thighs, the nates and sacral regions, the inner and middle gluteal, the anal, perineal, posterior scrotal regions, and all the surface of the penis. Hot and cold test-tubes could be recognized only by the touch, and differences of five to fifteen degrees [Cent. ?] could not be differentiated or localized. Sensibility to pain was absent in the same areas.

Deep sensibility and sense of position were not affected, except as to the toes. During the patient's stay in the hospital the motor power increased slightly, but sensibility remained unchanged. The author discusses at length the differential diagnosis, excluding hysteria, traumatic neurosis, syringomyelia, and inclines toward the diagnosis of hemorrhage in the lower cord, with concussion of the upper cervical cord affecting especially the pyramidal tract. Special analysis is made of the probable nature and position of the lesion in the lower part, which the author believes to be central hæmatomyelia of the posterior horns of the lower lumbar and all the coccygeal cord. A useful list of articles bearing on the various points involved adds to the value of the paper.

Carcinoma of the Duodenum.—SCHLESINGER (*Wiener klin. Wochenschrift*, 1898, No. 10) observed a case of this in a woman of fifty-eight years. Symptoms began a year before, with vague pain in the liver region. In a few weeks jaundice came on, and later the liver became enlarged, the gall-bladder distended. Examination of the stomach was negative. In the last week bilious vomiting often occurred at night; the stools, clay colored before, showed traces of bile-coloring matter; the jaundice was intense. There were no signs of stenosis of the intestine; the stomach-contents were never alkaline. Autopsy showed a cancer of the descending duodenum, extending to the diverticulum of Vater, with bending of the cystic duct, dropsy of the gall-bladder, and metastases in the liver. The absence of stenotic symptoms and of vomiting of large quantities are interesting. Out of 42,000 autopsies in the Vienna Pathological Institute (1870-1893) there were only seven of cancer of the duodenum. Of the whole number there were 3583 cancers, 443 being intestinal.

Iodine as a Test for Bile.—ROSIN (*Wiener klin. Wochenschrift*, 1898, No. 11) calls attention again to the use of iodine as a test for bile. The reagent is a dilute tincture of iodine, of a bright mahogany color. The test is made by allowing the iodine to run into an inclined test-tube containing the suspected fluid, and in the presence of bile forms a grass-green ring at the point of contact.

Pseudoleukæmia and Tuberculosis of the Lymphatic Organs.—C. STERNBERG (*Zeitschrift für Heilkunde*, Bd. 19, p. 21) has examined eighteen cases diagnosticated clinically in various Viennese hospitals as pseudoleukæmia. In some of these it is intimated that the clinical course had been like that in the cases of so-called chronic-relapsing fever described by Pel, Ebstein, and others. It is unfortunate that Sternberg gives no clinical histories and no precise statement of the symptoms actually present in these cases. Anatomically the conditions were very interesting and were carefully examined. In the liver, spleen, bone-marrow, lungs, etc., there were areas of lymphoid tissue containing many large cells having one or more deeply staining nuclei and often in karyokinesis. These resembled certain tumor-cells, and if viewed alone the tissue in these parts might have been taken for sarcoma. However, the tissues in which the large cells were found often passed gradually into the neighboring stroma or the walls of the capillaries,

and transition forms from the endothelial cells to the large cells were not uncommon. Often undoubted endothelial cells showed karyokinesis. In the same organs there were also small and large necrotic areas, often nodular, and sometimes showing the remains of a structure like that just described. These areas presented, therefore, an anæmic necrosis, but beside this there was also caseous degeneration, sometimes with Langhan's giant-cells near it. Moreover, in most of the organs there were typical tubercles in which bacilli were sometimes, but not always, to be found. The author discusses the various possibilities, and comes to the conclusion that all the changes were due to a tuberculous infection of a peculiar kind, with chronic inflammation of the lymphatic apparatus. The conclusion that the (anatomic) diagnosis of pseudo-leukæmia must not be made until the possibility of tuberculous has been excluded is not new, but bears repetition, and the author is to be congratulated on pointing out the interesting changes observed in his cases.

The Significance of Eosinophile Cells in Tuberculous Sputum.—TEICHMÜLLER (*Centralblatt für inn. Med.*, 1898, No. 13) calls attention to this as the result of the examination of 153 patients. In 111 of these eosinophile cells were easy to find in the sputum, months before bacilli could be found, according to the author. The occurrence of these cells points to an attempt at defence on the part of the organism, most evident in fairly strong individuals, and not so certain in anæmics and cachectics. In recovery, the gradual increase of eosinophile cells is always notable, and a diminution in their number at any time indicates relapse, or, if the fall is rapid, quick consumption.

Intermittent Chronic Icterus.—ALBU (*Deutsche med. Wochenschrift*, 1898, No. 13) reports the following: The patient, a girl of sixteen years, had measles as a child; at six she became jaundiced, and remained so six months. At thirteen there was another attack of jaundice lasting eight months, and at fifteen one of six months' duration. The fourth attack came on at sixteen, and when reported had lasted four months. According to the mother, an inflammation of the throat preceded every attack, a statement the author questions. In the previous attacks, especially the second, there was severe pain in the region of the stomach and liver, not colicky. Chills and fever have not been present. Recovery from the attacks begins suddenly. In the present attack there is no fever, the appetite is good, and bowels regular; the patient is emaciated and feels weak. The jaundice is intense; there is great itching. Ascites and enlarged spleen are absent. The liver is enlarged all over, dulness extending from the upper border of the fifth rib in the mammillary line to three fingers' breadth below the rib. The surface is hard, uneven, and sensitive. The feces for months have been without bile-coloring matter.

Albu looks on the case as one of gallstone with secondary hypertrophic cirrhosis of the liver. Incidentally he mentions the occurrence of gallstone in several members of two families recently observed by him. In one family three married sisters were affected, in the other a married woman and her unmarried sister.

SURGERY.

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The Indications for Surgical Treatment in Biliary Lithiasis and Infection.—The pathological processes which demand surgical intervention are divided by FORGUE (*Gaz. Hebdom. de Méd. et de Chir.*, December 19, 1897) into those which are due to obstruction of the biliary passages by calculi and those due entirely to infection; there may, however, be cases in which both conditions are present.

The indications for the various methods of operating, or the operation of choice in a particular instance, would, he believes, be best based on the following principles:

Cholecystostomy: He agrees with Terrier, that, where the biliary passages, either indirect or direct, obstructed by calculi or not, are the seat of inflammation which produces intense febrile movements, continuous or with exacerbations, the indications are for a laparotomy, to open the bladder and let it remain open, forming a fistulous opening in the skin; in other words, perform a cholecystostomy.

The persistence of the biliary fistula is assuredly the most serious objection to this operation. There are, however, numerous cases in which the patients continue in satisfactory health despite the great amount of bile lost. Krumpmann's patient lost daily, for eight years, a quantity varying between 240 and 270 grammes.

Cholecystectomy is the operation of choice in cases of biliary calculi. There must, however, be asepsis of the entire tract, and the permeability present or attainable of the ductus choledochus.

Cholecystenterostomy is most favorably employed in cases where an exploratory laparotomy shows an inoperable neoplasm compressing the ductus choledochus. The operation is favored in these cases by the dilatation of the duct. There are certain other cases where the gall-bladder is contracted and the duct obstructed by a firmly-implanted calculus.

Choledochotomy is the operation preferable in cases of obstruction of the ductus choledochus by a calculus, but in these cases a preliminary cholecystostomy is generally a necessity. In an aged patient the prey of malnutrition, the hepatic lesions already far advanced and probably complicated by cardiac and renal lesions, the effect of a long operation would not be well borne; here a cholecystostomy would be the preferable operation.

The biliary fistula, by relieving the retention, may change the whole aspect of the case, if the other organs are not too seriously injured. It is, however, where the biliary passages are infected that this operation renders the greatest service, permitting thorough antiseptis, which may be subsequently followed up by a choledochotomy, if persisting symptoms indicate it.

The Treatment of Backward Dislocation of the Thumb.—HUTCHINSON (*British Medical Journal*, January 15, 1898) reviews the treatment of this dislocation and the anatomical relations of the parts, and, while insisting that there is nothing absolutely new in the treatment advised, shows that in many cases the following method of treatment is available and satisfactory, and that it is often overlooked in compiling text-books on surgery, and is apparently unknown to many surgeons:

His advice is: 1. In backward dislocations of the first thumb-phalanx, a careful trial should be first given to the manipulation method described so well by Mr. Farabeuf and others.

2. If this fails a tenotome should be introduced from the dorsum, behind the projecting base of the phalanx, so as to divide the glenoid ligament and allow the sesamoid bones to slip on either side of the metacarpal head.

3. This method of section divides no important structures, is perfectly safe if aseptic precautions be observed, and will not interfere with the subsequent utility of the joint. It is, therefore, preferable to all methods involving a palmar incision.

The Treatment of Chronic Ulcers of the Leg.—V. LANGSDORF (*Centralblatt für Chir.*, November 20, 1897, No. 46) describes the following method, which has resulted in his hands in rapid and permanent healing.

The first step is thorough antiseptis of the wound and surrounding skin; this he procures by first washing the entire leg with soap and water and carefully drying it. Then the area of the wound is covered with calomel, which is converted into a thick paste by mixing it with water. Over this paste salt is strewn and thoroughly mixed in. A gauze and cotton dressing is then applied. The action of the salt upon the calomel produces sublimate. This nascent sublimate is very active, and for three or four hours produces an intense burning, which gradually subsides.

After twenty-four hours the wound is dressed, and a dry wound free from unhealthy granulations is found, which is perfectly aseptic. The pain which had accompanied the inflammation and infection in the surrounding skin margins is almost entirely cured by this dressing. The application of unguentum basilicum, with rest in bed, produces a speedy covering of the wound with new skin. Exuberant granulations are touched with crystals of copper sulphate. If there is an area which refuses to heal, toward the end of the treatment, the author applies a healing ointment to a sterile piece of cardboard, holding it firmly in place with a compressive cotton dressing and bandage. After complete cicatrization the whole lower leg, including the foot, is placed in a fixed dressing for two weeks. The resulting skin is very firm, and does not have the tendency to break down which is so often seen in these cases after other forms of treatment.

The Result of the Serum-treatment of Diphtheria as Exemplified in Ninety-six Cases Seen in Private Practice.—AYLWARD (*British Medical Journal*, January 15, 1898) reports the comparative results of the serum-treatment and other methods in a series of cases in one outbreak of this disease which was mild in type, though some of the cases were severe; one-fourth of the cases were treated without the serum, the remaining three-fourths were treated by it.

The effects of the serum not only upon the false membrane, but upon the patients generally, were, as a rule, astonishing. When I began its use some seventeen months ago I had a most healthy scepticism as to its value, and was quite prepared to find it little better than many other much-belauded modes of treatment. Experience in its use made me a grateful enthusiast.

Its effect upon the false membrane seems to depend mainly upon the length of time the membrane has been formed. If recent, it seems to disintegrate and almost dissolve away. If it has been in existence some days, the absence of spread will be the main indication of the effects of the serum.

The mortality in twenty-four non-serum cases was equal to 12.5 per cent., and in seventy-two serum cases was equal to 4.16 per cent.

The cases that died under the serum-treatment were those that had had no medical aid until the disease was fairly in an advanced stage.

It is most important that injection be performed at the earliest possible moment after a definite diagnosis has been made, and it is especially in connection with this point that I believe better results will be obtained in private than in hospital practice. Even in the best organized ambulance service some hours must usually elapse after the diagnosis has been made at home before treatment can be commenced at hospital, and under unfavorable circumstances the time might be longer. This delay in a disease like diphtheria may, in some cases, prove to be the death-warrant. This view is strongly supported by the fact that all but one of the fatal cases had been neglected for several days, and this solitary case was one of the earlier cases in which, to my lasting regret, I failed to use the serum-treatment. The same truth is further exemplified by the fact that only one death occurred in the last fifty-eight cases, mainly, I think, because the people began to realize the importance of seeking advice early. Moreover, in by far the majority of cases, the disease begins in the tonsils, and spreads from these glands to more dangerous regions. Early injection will in most cases prevent this spread. A very considerable proportion of the 51 per cent. in whom the false membrane did not spread beyond the tonsils were those who were living in the same rooms or houses with the fatal or more severe cases, and were, consequently, seen early, often before the false membrane appeared at all.

The small percentage of laryngeal cases may be similarly accounted for. One word in reference to immunizing injections. It is strongly recommended by some to use them for all members of a household where diphtheria appears. I have never done so, nor have I injected a suspected case of diphtheria before false membrane has appeared. My reasons for not doing so are: 1. That in every case of this series in which serum was used in full doses on the first appearance of false membrane, the arrest of the disease was prompt and efficient. 2. Considerable pain is often caused by injec-

tion. 3. Although the risk is probably very small, it cannot be said to be absolutely *nil*. 4. It is open to question whether it is prophylactic at all.

Air Infection.—In tracing the sources of error in aseptic methods of operating, FLÜGGE (*Cent. f. Chir.*, 1897, No. 39) has reported some very interesting results which he has obtained from the experimental study of the infection which results from bacteria carried about as dust particles in currents of air in operating-rooms, or in minute particles of moisture that also float for a length of time in the air. These dry particles and drops of moisture float in the air of a room for four or five hours, and are carried by the currents in the room long distances. It was determined that such drops could be discharged into the air by coughing and sneezing, from the frequently infected mucous membranes of the nose and throat. Even talking loudly would infect plates at a considerable distance from the speaker.

Although the author does not intend to imply that this is the most frequent source of infection in cases of aseptic wound treatment, he does claim that such infection may take place, and that it is more plausible as a theory to believe that such infection occurs than to blame all such infection on a poor antiseptic of the skin in the field of operation. The pyogenic micro-organisms are found in the normal secretions of the nose and mouth of healthy individuals, and where carious teeth are present the danger of infection is certainly greatly increased.

The infection through the air may, therefore, be a ready explanation of many cases of infection hitherto unaccounted for. It can be occasioned either by the surgeon, his assistants, the nurses, the onlookers, or the patient himself, and a moderate distance of these persons from the operator does not in any wise preclude them as the source from which the infection may arise.

The coughing of the patient or stertorous breathing may be a source of infection in itself. Thus, although this is not a frequent source of infection, it is nevertheless a positive source which will account for some of the failures which occasionally occur in aseptic operations.

The Operative Treatment of Cleft Palate.—In a clinical lecture upon this subject, OWEN (*The Lancet*, January 29, 1898) gives the following practical advice:

When to operate: If the cleft is confined to the soft palate and the infant is in a satisfactory state of health, the operation may be done within a few months after birth. But if the hard palate is involved, he prefers to wait another year to avoid the danger of shock from the operation. He prefers to operate in all cases upon the entire cleft at once, as it is essential to the successful performance of the operation to detach in a measure all parts of the periosteum.

The child should never be operated upon till the general health and conditions are good or failure is courted. Carious teeth, enlarged tonsils, and adenoids should be removed before operation for the cleft is thought of. If a choice is possible, the operation should be done in mild, fine weather, so that the child can be taken out of doors soon.

The best position is on the back with the head hanging over the end of the

table, so that the blood, instead of finding its way into the larynx and stomach, may sink into the naso-pharyngeal dome and, welling up by the mouth or nostrils, may find harmless escape.

The anæsthetic preferred is chloroform given by Junker's apparatus. The form of gag is a difficult question, as none has been devised that always acts successfully. Smith's gag is the one he uses.

Operation: The first step is the removal of a continuous strip of mucous membrane from the margin of the cleft; this should be uniform in thickness and if possible be taken away in one continuous strip, so that no point will be left undenuded. The palate-knife should be thin-backed with a long cutting edge; old tonsil bistouries that have been frequently ground are very serviceable. Sponges should be firm and honeycombed, but not squeezed up. They should be about the size of a pigeon's egg and firmly attached to the holders.

The next step is a cut three-quarters of an inch long just inside the molar teeth of the superior maxilla. Passing through to the dome, branches of the descending palatine arteries are divided; the bleeding is checked by pressure. The periosteum is then released from the bone by variously curved raspatories. This lifting of the muco-periosteal flaps releases the flaps from tension and permits the closure of almost any size of cleft. The velum must be disconnected from its fibrous attachment to the bony palate, and the thoroughness with which this is done has a marked influence upon the success of the operation. The best way of doing this is by using a pair of scissors bent on the flat almost to a right angle, and cutting through the nasal mucous membrane of the velum.

The author prefers silver-wire sutures inserted, beginning at the incisor teeth. The silver sutures are best fastened by ordinary torsion forceps. The lateral cuts are ignored, the bleeding having been stopped by pressure.

Failure does not preclude a second operation, and in an instance cited the infection which took place seemingly created a temporary immunity which rendered the second operation successful.

Removal of a Bullet from the Brain Located with the Aid of the Röntgen Rays.—BRAATZ (*Cent. f. Chir.*, 1898, No. 1) reports an interesting case in which he was able, after two attempts, to remove a bullet from the brain substance, the patient making a complete recovery.

The symptom most complained of was an intense pain that was unbearable when the head was held to the left side. After a number of skiagraphs had been taken, one was obtained which showed the ball in the anterior portion of the brain. In this skiagraph an iron wire had been placed above the ear and extending onto the forehead, while in front of the ear and perpendicular to the first wire a measurement was made in centimetres by means of horizontal pieces of wire.

The first operation consisted in the formation of a bone and integument flap by means of Gigli's wire saw, the opening being increased in size by the use of rongeur forceps. The ball, however, was not found, even after the dura was opened and the brain palpated. The difficult breathing of the patient necessitated a cessation in operating, and the wound was closed and healed by primary union. There was, however, no relief from the symptoms.

A series of skiagraphs were now taken, but it was impossible to get a picture in the antero-posterior direction. In all of these cases Reed's base line was marked by lead wire and showed in the skiagraphs. At length by placing the plate at an angle on the left temporo-frontal region a skiagraph was obtained from a second point, which showed the shot. In this case a lead wire was placed above the nasal bones so that this point was readily determined.

A second shadow, which was due to a fragment of lead upon the opposite side of the cranial cavity, was also shown, and from these points and their relation, it was roughly determined that the ball lay deeper in the brain substance than had been at first supposed, and anterior to the opening made in the first operation.

This rough method of determining the location of the ball, which is crude compared with numerous mathematical methods now employed, served the purpose of guiding the ingenious efforts of the author to the successful removal of the ball in the following manner.

The bone integument flap formerly made was again removed and the dura mater. A blunt needle was now employed as a probe, and the brain punctured in the direction of the bullet, which was finally located. A dull fruit-knife was then passed along the needle, thus avoiding hemorrhage, and after this a pair of closed Koehler's forceps with which he finally succeeded in grasping and removing the bullet. The patient made an uninterrupted recovery.

The Primary Union of Extensive Wounds.—The difficulty met with in procuring primary union in wounds of great depth or of large flaps, as after amputations, has led frequently to attempts by numerous operators to devise new methods in the hope of avoiding drainage or the accumulation of clots that must gradually be absorbed. It is in this connection that HIRSCHBERG (*Cent. f. Chir.*, 1897, No. 52) has devised the following method of suturing, which he claims does away entirely with the necessity for drainage and the use of compressive dressings, as advocated by Credé, while it prevents the accumulation of clots or serum by holding the even extensive flaps in close apposition throughout their entire extent, and thus promoting primary union.

The method of suture he employs is modelled upon that used by Tait in recto-vaginal fistulæ; it is essentially as follows: The entire wound is encircled by the silver-wire sutures; they do not, however, enter through the skin, but just within its margin, passing deeply beneath the bottom of the wound and emerging on the opposite side just within the skin. They are not tightened much in knotting, but each stitch compresses the tissues on either side of the wounds, as if they were between the arms of a safety-pin. The skin edges, though not penetrated, are thus brought closely together and unite *per primam*. Interrupted sutures may, however, be placed between the silver sutures in some cases with advantage.

The peculiar advantages of this method are that there is no foreign suture material in the wound area. The walls of the wound are held in close approximation by the wire sutures, which run outside of them and yet parallel, and hold them so that they cannot fold upon themselves. In removing these sutures the wire loop should be drawn up sufficiently to permit the introduction of sharp-pointed scissors.

OTOLOGY.

 UNDER THE CHARGE OF

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Foreign Bodies in the Ear.—R. HAUG (*Deutsche med. Woch.*, February 3, 1898) reports another case illustrative of the evil results of trying to remove a foreign body, a carob-bean, from the ear by means of forceps and hooks, instead of by syringing. In this case, when the patient was sent to Haug on the ninth day of the trouble, the auditory canal was in a high state of phlegmonous inflammation, the auricle and surrounding region swollen, and the cutis of the osseous part of the auditory canal torn out by the manipulations of an unskilful person, so that the periosteum was exposed. By means of a probe the foreign body could be felt firmly embedded, but could not be seen through the swollen and closed canal. As pain in the ear and mastoid increased, and headache, vertigo, nausea, and fever set in, and as it was impossible now to remove the swollen bean through the inflamed and narrowed meatus, the auricle was detached behind and thrown forward, when it was found that the foreign body had been pushed through the membrana tympani into the drum-cavity and rested upon the promontory, where, by reason of the swelling of the bean, from the constant bath of pus in which it lay, it was firmly wedged in the drum-cavity, and was removed only after chiselling off a portion of the osseous canal near the membrana, which liberated the foreign body. Entire recovery took place in about two months.

A piece of maple-leaf, rolled into a ball and inserted into the ear of a girl of five, and easily removed by means of a delicate hook, after the child had been etherized, is reported by C. H. BURNETT (*Philadelphia Polyclinic*, October 2, 1897). When this patient was first seen by Burnett her ear had already been manipulated by another physician, so that the child would not permit further treatment of the ear, not even by syringing. Therefore she was etherized and the foreign substance hooked out of the ear.

That even in the present day a patient may suffer a long time from *ceruminous deafness* without seeking relief is shown by a case of seven years' duration relieved by B. A. RANDALL (*Philadelphia Polyclinic*, August 7, 1897) by syringing.

CARETTE (*Annales des mal. de l'Oreille, etc.*, February, 1898) records the case of a young man who, by the accidental discharge of a pistol in his own hands, received the *bullet in his auditory meatus*, where it moulded itself firmly to the walls of the canal near the junction of the cartilaginous with the osseous portion. The only symptom evoked was a mechanical deafness and a slight synovitis of the adjacent maxillary joint. Detachment of the auricle from the osseous canal, after an incision behind it, enabled the operator to remove, by gouges and drills, the impacted bullet. Entire recovery in all respects took place under antiseptic treatment in one month.

[The *first* effort that any one should make to remove a foreign body from

the ear should be with syringing warm water or oil into the external auditory canal, after the physician has assured himself by ocular inspection that a foreign substance is in the ear. If a physician cannot examine an ear with otoscope and speculum, and then syringe the ear, he should let the case alone. Usually syringing is sufficient to remove a foreign substance from an ear; if it is not, *any other effort with any kind of instrument* should be made only by an expert.—ED.]

Rupture of the Tympanic Membrane.—In a paper with this title, W. C. BRAISLIN (*Brooklyn Medical Journal*, January, 1898) presents the following conclusions: 1. The drum-membrane may be ruptured without direct impact of a foreign body upon it—i. e., by the expansive force of air condensed within the auditory canal [as in a box on the ear]. 2. A pre-existing middle-ear disease predisposes to such traumatic perforations. 3. The presence of a middle-ear disease previous to the trauma is determined inferentially by the present condition of the opposite ear. 4. Prognosis regarding the healing of an uncomplicated perforation is good [if let alone]. 5. Severe tinnitus may be a result of labyrinthine concussion, and prognosis regarding the outcome of this symptom must be guarded. 6. Treatment is largely expectant until the perforation is healed. 7. In most cases, after this has occurred, additional treatment directed to the middle ear is beneficial.

[On the supposition that the middle ear was not affected before the traumatic rupture of the membrana tympani, when such a rupture occurs the meatus should be stopped with sterilized cotton, nothing else done, and the ear let alone.—ED.]

Gout and Syphilis in Ear Diseases.—C. BAUM (*Philadelphia Polyclinic*, July 24, 1897) testifies to the effect of gout as a cause of ear disease, especially in producing earache at night and tinnitus aurium without deafness.

That not only sudden and bilateral deafness, but also a fetid purulent otitis media, may develop simultaneously as the result of syphilis is shown by E. F. PARKER (*Journal American Medical Association*, October 9, 1897); under "heroic antisyphilitic treatment with mercurials and iodides, such a case recovered hearing to some extent."

Operative Relief of Chronic Catarrhal Deafness.—Excision of any part of the conducting apparatus is justifiable only when relief from severe tinnitus and vertigo is the object of treatment, and other measures have failed, is the opinion held by MACCUE SMITH (*Atlanta Medical and Surgical Journal*, November, 1897), C. H. BURNETT (*Pennsylvania Medical Journal*, February, 1898), and others.

Experience has shown that an operation on the membrana and ossicles of one ear, in chronic catarrhal deafness, has a good effect upon the other ear, as claimed by MALHERBE (*Revue de Chir.*, June, 1897) and others.

Middle-ear in Measles.—The conclusions of BEZOLD and TOBEITZ, that the inflammatory process in the middle ear in measles usually runs its course without subjective, and often without objective symptoms, and only now and then leads to spontaneous perforation of the membrana, and that

the ears in measles should therefore be carefully watched, so that no permanent lesion in the ear may remain as a sequel of the exanthem, is shown by a case reported by A. O. PFINGST (*Pediatrics*, February 1, 1898).

[If perforation of the membrana appears desirable, it should be brought about by paracentesis, and not by poulticing, as some physicians recommend, because poulticing is liable to produce sloughing of the entire membrana tympani and exfoliation of the ossicles.—ED.]

DERMATOLOGY.

UNDER THE CHARGE OF

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A Case of Pseudo Lupus Vulgaris Caused by a Blastomyces.—GILCHRIST and STOKES (*Journal of Experimental Medicine*, 1898, No. 1) report a case of extensive cutaneous disease due to the invasion of the skin by a blastomyces. The patient was a man, aged thirty-three years. The disease began as a pimple, which soon became pustular, at the back of the left ear, and extended slowly until it covered almost the entire face, which it left in an atrophic cicatricial condition. One month after the appearance of the primary lesion a similar one appeared upon the back of the hand, which healed at the end of four years, after treatment by cauterization. A third lesion appeared upon the scrotum, which, after enlarging for a year, healed spontaneously. Later, other lesions appeared upon the thigh and the back of the neck, which also healed spontaneously. Sections of the lesions showed the presence of budding blastomycetes. In many sections almost typical tubercles were found. The organisms found in the sections were spherical, unicellular structures with a doubly-contoured membrane, varying in size from 10 to 20 μ , and contained a fine, granular protoplasm. The parasites were found in most instances outside of the cells, a few were inclosed in giant cells. Inoculations with pure cultures of the organism were successfully practised upon dogs, horses, sheep, and guinea-pigs, producing nodules in the lungs in which numerous parasites similar to those obtained from the patient were found. The authors propose the name *blastomycetic dermatitis* for the disease produced by this organism.

The Localization of Porokeratosis upon the Buccal Mucous Membrane.—DUCREY and RESPIGHI (*Annales de Dermatologie et de Syphiligraphie*, 1898, No. 1) in a preliminary note call attention to the fact that the lesions of porokeratosis are not limited to the skin, but may occur likewise upon mucous membranes. In three out of four typical cases observed by them,

lesions were found upon the mucous membrane of the lips, cheeks, tongue, the palate, and the gums, presenting appearances identical with those seen upon the skin, excepting, of course, the modifications due to their special seat. These lesions consisted of opalescent spots, varying in size from a pin-head to a lentil, rounded, oval, reniform, or polycyclic in shape, bounded by a linear, opaque-white elevation which, in some cases, was divided throughout its length by a narrow furrow. No subjective sensations accompanied these buccal lesions, which were always limited in number.

Leucoderma Treated by Carbolic Acid.—SAVILL (*British Journal of Dermatology*, March, 1898), at a meeting of the Dermatological Society of Great Britain and Ireland, showed a girl, aged sixteen years, in whom there were numerous white patches surrounded by zones of brown pigmentation in the groins, on the abdomen, and the legs. Over the sacrum, the nape of the neck, and in the armpits were patches of brown discoloration only. The patches on the nape of the neck and the sacrum were painted with pure phenol. At the end of three weeks the skin had resumed its normal pink color.

Acute Pyrexial Pustular Dermatitis.—PHILLIPS (*British Journal of Dermatology*, March, 1898) reports a case of generalized pustular eruption occurring in a married woman, aged twenty-seven years. When first seen she was evidently ill, and the skin presented a striking eruption which had existed for one week. The disease began on the backs of the knuckles and the wrists, spreading later to the anterior surface of the legs. It consisted of inflamed, irregularly-shaped or roundish patches on which were many pustules, each as large as a pea. These patches were herpetic in appearance, except that the lesions were pustules from the beginning. There were also groups of discrete pustules seated on a red and swollen base. The lesions did not rupture readily, nor did crusts form; but involution took place by absorption, beginning in the centre of the patch, while perfect pustules remained about the margin. Upon putting the patient to bed the evolution of the disease soon ceased. There was considerable constitutional disturbance, the temperature reaching as high as 103° F. The pyrexia subsided with the disappearance of the local lesions. The cause of the disease was not discoverable.

The Treatment of Scleroderma by Electrolysis.—BROCC (*Annales de Dermatologie et de Syphiligraphie*, 1898, No. 2) reports eight cases of scleroderma occurring in plaques and bands treated successfully by electrolytic puncture. The method employed is much the same as that for the destruction of hairs. The strength of current to be employed will depend upon the sensitiveness of the patient and the infiltration of the tissues. In timid patients the current strength should be from one-half to two milliamperes; in more courageous ones, five to ten milliamperes may be employed. When the tissues are very thick and deeply infiltrated the current must be allowed to pass for a longer time than when the plaques are thin, and a greater current strength is necessary. After two or three sittings the progress of the disease is almost always stayed. The use of electrolysis should be combined with applications of mercurial plaster made between the sittings.

OBSTETRICS.

 UNDER THE CHARGE OF

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Obstetric Progress in Recent Years.—In an interesting address on the occasion of his retiring from active service, PLAYFAIR summed up the important advances in obstetrics as follows (*British Medical Journal*, 1898, No. 1942): As regards the persistent mortality from puerperal sepsis in private houses, he is convinced that the blame does not lie with physicians. The source of the trouble is to be found in the lack of control over midwives and obstetric nurses, as it is almost impossible to oblige them to be clean and aseptic. Antisepsis has made possible the recent success in Cæsarean section, symphysiotomy, and abdominal section for ectopic gestation.

Playfair is distinctly an advocate for the proper use of forceps. He discounts entirely from the recent address of Sinclair, and believes that more damage is done mother and child by long delay in labor than by the proper use of instruments. As regards the future of obstetric practice, he believes firmly that obstetrics and gynecology is each so large that a separation between them must eventually take place. He is positive that the evolution of medicine has produced a class of practitioners who are and must be physicians and surgeons in a higher sense, and the sooner this fact is acknowledged the better. He considers a modern obstetrician as both physician and surgeon.

A Fatal Case of Tetanus of the Uterus.—In the *Centralblatt für Gynäkologie*, 1898, No. 15, BRÜNINGS reports the case of a multipara to whom he was called in her fourth labor. She had been under the care of a midwife who had ruptured the membranes some time before. As labor proceeded slowly, a physician had been called, who diagnosticated a second position with a vertex presentation. When the mouth of the womb was completely open, this physician attempted to deliver by forceps and by version, but without success.

When the patient was examined it was found that the abdomen was so tense that the fœtus could not be plainly outlined. The lower uterine segment was greatly stretched. There was a foul discharge from the womb, and uterine tympany was beginning. There was a large tumor of the fœtal scalp. The head was wedged firmly into the pelvis, the sagittal suture was in the right oblique diameter of the pelvic brim, and the smaller fontanelle was on the right side and behind. The patient was deeply anæsthetized and an attempt made to apply the forceps. It was impossible to bring the head down, and this attempt was followed by the formation of a hæmatoma of the vulva. The child's heart-sounds ceased to be heard. An attempt was then made to

deliver the patient by craniotomy. The head was accordingly opened in the sagittal suture and as much as possible of the brain washed out. The operator, however, could not apply satisfactorily the external blade of the cranioclast. Accordingly the instrument was used as firmly as possible and the bones of the skull were extracted. The bleeding in the labium was so great that it was necessary to incise the labium and check the hemorrhage. The operator failed to deliver the patient by craniotomy after trying for an hour and a half, and then opened the abdomen and extracted the fœtus by Cæsarean section. There was no rupture of the uterus, but the entire tissue of the womb was livid and dark, and its peritoneal covering was engorged and full of serum. The death of the mother soon occurred.

On examination it was found that the child was abnormally large. The mother's pelvis was also contracted, the true conjugate being 9½ cm.

[This case seems to us to be an extraordinary example of bad management: first, a midwife, next a general practitioner, and last an assistant in one of the principal obstetric clinics of Europe contributed to the fatal issue. We should like to call the attention of those who advocate midwives to the fact that the first mischief was done by one of these miserable persons. We should like also to bring to the attention of those who decry pelvimetry the fact that both of the physicians in this case measured the pelvis after the woman was dead! It is usually considered advisable to measure the pelvis before the death of the patient.—ED.]

Removal of Fibroid Tumors of the Uterus During Pregnancy.—In the *British Medical Journal*, 1898, No. 1948, WALLACE reports the case of a patient, aged thirty-eight years, who, shortly after marriage, had an abortion, accompanied by very free bleeding. An abdominal tumor had been present for about twenty months. On examination a hard tumor was found in the abdomen, apparently springing from the womb. The uterus was pregnant and retroverted. The uterus was wedged in behind the tumor in such a way that the normal enlargement of the womb necessary for pregnancy to continue was impossible.

On opening the abdomen the tumor at once presented a whitish-yellow mass, calcareous, and with a hard, uneven surface. Bands of adhesion connected it with the pelvis. After these were freed, no attachment to the womb could be found, and the tumor was easily drawn out of the abdomen. The pregnant uterus had attached to its anterior wall two fibroids by a common pedicle. These were also removed. The patient made a good recovery, and the pregnancy continued. The patient's morning sickness, which had been annoying, ceased after the operation.

The calcified tumor weighed one pound and two ounces. On section, it was found to be a fibroid with a narrow calcified zone extending around the tumor.

The Symphysiotomies One Does Not Do.—Under this title, QUEIREL, of Marseilles (*Annales de Gynécologie*, February, 1898), describes seventeen cases of labor in women having pelvis deformed to some extent, in which at some time during labor it seemed probable that delivery by symphysiotomy would be necessary. In each of these cases, however, the patient was safely delivered either by spontaneous birth or by a comparatively easy application of the forceps.

It is unnecessary to quote these cases in detail. The pelvic contraction in none of them was pronounced, and all would have been suitable cases for symphysiotomy. A number of the mothers had lost children in previous births by craniotomy or in prolonged spontaneous birth. The point which is emphasized by these cases is the fact that the only test of labor is careful and intelligent study of parturition itself. It is absolutely impossible from pelvic measurements only, or from previous history alone, to say definitely that a woman cannot be delivered without a given obstetric operation. Each case of abnormal pelvis or of abnormal fœtus demands careful study. The pelvis should be measured and every effort made to appreciate the relative size of the fœtus. The mother's general condition, her age, her strength, and the circumstances in which she is must also be taken into account. A decision must then be made, either to interrupt pregnancy or to allow it to go on to its natural end. When labor occurs the operator must stand prepared to assist nature, and the success or failure of the labor will depend not so much upon the obstetric operation chosen as upon the selection of the right moment for operating, the abstaining from efforts which cannot succeed, and the scrupulous and aseptic care given to the patient.

GYNECOLOGY.

UNDER THE CHARGE OF
HENRY C. COE, M.D., M.R.C.S.,
OF NEW YORK.

Frequency of Gonorrhœa in the Female.—BOURSTEIN (*Wretch*, No. 29, 1897), in routine examinations of the uterine and vaginal secretions in 246 women with various pelvic troubles, found gonococci in 40 (17 per cent.), in the cervical discharge in three-fourths of the cases. The average age of the women thus affected was twenty-eight.

The writer argues in favor of more frequent microscopical and bacteriological examinations in suspected cases. He believes that the gonococci rarely preserve their vitality beyond three days in one locality.

Uterine Ptosis.—REYMER (*Sem. Gyn.; La Gynécologie*, 1897, No. 6), in a clinical lecture on this subject, calls attention to the association of uterine displacements with general relaxation of the muscular system, enteroptosis, scoliosis, tarsalgia, etc. In such patients, whether married or single, it is not necessary that there should be any lesion of the pelvic floor, though the condition is most frequently observed in those who have borne children.

Unmarried women are neurotic, with flabby tissues, a relaxed abdominal wall, herniæ, movable kidneys, dilatation of the stomach, lateral curvature of the spine, and have usually had adenoid vegetations of the naso-pharynx in early life. In those who have borne children, the mere presence of a laceration of the pelvic floor is not necessarily the cause of the accompanying

prolapsus, which is due rather to want of tone in the uterine ligaments. The organ is easily replaced without pain, but at once resumes its abnormal position.

Primary Tuberculosis of the External Genitals.—PAOLI (*La Gynécologie*, 1897, No. 6) reports five cases of this affection, which he regards as less rare than is commonly supposed. He believes that the disease is frequently communicated directly during coitus, the primary site being in the region of the vestibule, whence it extends gradually to the surrounding tissue.

It is distinguished clinically by ulceration, with hypertrophy of the labia. It runs a chronic course, and remains localized for a long period, the general health being but slightly affected. The inguinal glands are often not affected, contrary to the prevailing opinion. Microscopically intense congestion and inflammatory infiltration are noted; caseous degeneration is rare, and spontaneous repair is the rule. Secondary tuberculosis of the external genitals extends more rapidly and exhibits a more malignant character.

The treatment is surgical, extensive resection of the affected tissues being necessary. A considerable portion of the urethra may be removed without unpleasant results.

Changes in the Ovaries in Acute Infectious Diseases.—POPOFF (abstract of thesis in *La Gynécologie*, 1897, No. 6) examined the ovaries of fifty infants dying of various acute infectious diseases, arriving at the following conclusions: In measles, scarlet fever, and smallpox the lesions are confined mostly to the primordial follicles and stroma, consisting in swelling of the epithelial cells, vacuolization of the protoplasm, and finally general decomposition of the follicle. General hyperæmia of the stroma and sometimes diffuse or localized hemorrhages were observed. These changes were least marked in connection with measles. They were most extensive in cases in which two infectious diseases developed at the same time.

Subcutaneous Injections of Saline Solution.—JACOBS (*Scm. Gyn.*; *La Gynécologie*, 1897, No. 6), while admitting the great value of saline injections in cases of profuse hemorrhage, states that in so-called "delayed shock" his results have not been satisfactory.

Artificial serum has no bactericidal action, nor does it oppose any barrier to the entrance of infection, although in some cases it has seemed to arrest a mild commencing process. It is possible that the injection of serum may improve the general condition to such an extent as to augment phagocytosis. This does not apply to streptococcus-infection.

When sepsis develops after operation, saline injections should be used without delay. If there is not a prompt response, the infection is probably due to streptococci, and injections of the anti-streptococcus serum should be substituted.

Transplantation of the Ovaries.—GRIGORIEFF (abstract of thesis in *La Gynécologie*, 1897, No. 6) reports the results of a series of experiments in rabbits. Under strict aseptic precautions the abdomen was opened and the ovary was excised and sutured in different regions—to the broad ligament, the

mesentery, and in the utero-vesical pouch. In one case the ovaries of one rabbit were grafted into the uterine cornua of another and were covered with peritoneum, with the exception of the sides, which were allowed to project into the peritoneal cavity. After a considerable lapse of time the abdomen was re-opened and the transplanted ovaries were examined. Those attached to the broad ligaments retained their position, while the ovaries sutured to the mesentery were gradually absorbed, finally disappearing entirely. The former at first seemed to undergo atrophy, but later the atrophic process was arrested, and the engrafted organs resumed their normal functions, Graafian follicles developing and rupturing in the usual manner, with the formation of corpora lutea, while the discharged ova entered the tube and the uterine cavity.

PÆDIATRICS.

UNDER THE CHARGE OF

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Abscess of the Brain in Infants.—HOLT (*Archives of Pediatrics*, March, 1898) sums up a careful study under this title with the following conclusions:

1. Abscess of the brain in children under five years is rare.
2. The principal causes are otitis and traumatism.
3. It rarely follows acute otitis, but most often neglected cases, and is usually secondary to disease of the petrous bone.
4. In the cases occurring in infancy without evident cause, the source of infection is probably the ears, even though there is no discharge.
5. The development of abscess after injury to the head without fracture of the skull is extremely rare. In nearly all of the traumatic cases definite cerebral symptoms show themselves within the first two weeks after the injury. In cases with falls as remote as several months there is probably some other cause, such as a latent otitis.
6. In a large proportion of the cases only general symptoms are present, and these in very great variety.
7. Focal symptoms may be misleading unless they are constant, and even then they may depend upon associated lesions, such as meningitis. Motor symptoms only can be trusted, since the sensory symptoms are difficult or impossible to determine in infants or young children.
8. Rapid progress, fever, and a history of injury or otitis generally make a diagnosis from tumor easy. In the slower cases with little or no fever, valuable assistance may be obtained from lumbar puncture.
9. From acute meningitis the diagnosis is more difficult, and in the cases in which there are only terminal symptoms the diagnosis is impossible. In

the more protracted cases the distinctive points with reference to abscess are the slower and more irregular course and, as a rule, a lower temperature.

10. On account of the great amount of shock attending brain surgery in very young children, operation should not be urged unless definite localizing symptoms are present, the principal one being hemiplegia.

Adenopathies in Rhachitis.—FRÖHLICH (*Jahrbuch f. Kinderheilkunde*, 1897, Bd. xlv., S. 882) has made a study of 185 rachitic children in order to find out whether swelling of the lymphatic glands should be considered a part of the clinical picture of rachitis. In this number he found thirty-two in whom all glandular swelling was absent; these were children who had never suffered from any malady except rachitis.

In the other 153 cases there were divers adenopathies; but careful examination showed that these children had with their rachitis either a tuberculous affection or a skin disease (furuncle, intertrigo, eczema, strophulus, prurigo, etc.), or a gastro-intestinal trouble, and that the glandular enlargements should be attributed to these complications.

As to the influence of digestive troubles in the adenopathies of rachitis, the author believes that it must be accepted after the results of his examination of fifteen non-rachitic children with chronic digestive trouble in whom these adenopathies were found.

Enlargement of the spleen was noted in only thirty-three of the 185 rachitics examined, and was absent often in the cases with adenopathy. The author agrees with Stark, that this enlargement of the spleen does not depend upon the rachitis but upon concomitant chronic gastro-intestinal disturbances.

A Case of Pneumococic Croup.—SEUVRE reported to the Société Médicale de Reims (Séance of January 14th, *Revue Mensuelle des Maladies de l'Enfance*, March, 1898, p. 157) the case of a child of eight years, who, during an attack of influenza, manifested an erythematous angina. Laryngeal stenosis rapidly supervened and, despite the injection of Roux's antitoxin, called for tracheotomy on the evening of the same day. The wound gave issue to a false membrane of colloid appearance, which gave a pure culture of the pneumococcus. The case recovered.

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